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CONTENTS

	PAGE
Editorial Notes	469
B.T.C. Supplies Organisation	471
Opportunity in South Africa	471
Long Welded Rail Investigations	472
The U.S.A. Railway Position	473
Marshalling Yard Problems	473
Letters to the Editor	474
The Scrap Heap	475
Overseas Railway Affairs	476
Power Bridge Lifting Equipment	478
Track Loading Fundamentals—7	479
Combined Rail-and-Road Wagon	482
Personal	485
New Equipment and Processes	488
Contracts and Tenders	492
Notes and News	493

Training Engineers from Overseas

THIS country has a long and honourable tradition of affording technical education to railway engineers and operating staff from overseas, particularly to those destined for positions of authority. Formal education at British universities for some years has been supplemented by facilities for practical training on British railways and in the works of the leading manufacturers of railway material. Practical training and shorter tours for observation of British methods are also available for those who have studied in their home countries or elsewhere than in Britain. This training is of practical benefit to those who undertake it, and is also of importance to British industry in that it familiarises those influential in railway matters overseas with the high quality of British equipment and, in many cases, creates a justifiable predisposition towards specifying it for the railway concerned. Certain recent developments in the U.S.A. suggest that it is time that arrangements for study in this country were amplified, given greater publicity, and put on a more formal footing. For instance, the recent order for 100 diesel-electric locomotives placed by the Government of India with Alco Products Limited, of New York, is accompanied by provision for collaboration between the firm and the Indian Government in the training of Indian engineers and technical staff in repairs and maintenance. It is not yet known on what scale this training will be given—it may be no more than already is done in Britain and America—but the scope of potential competition from the U.S.A. in the engineering sphere is shown by the announcement last Monday of a grant of $1,500,000 to the Government of India by the Ford Foundation for training 200 Indian engineers in the management and production methods of the United States steel industry; these trainees will spend a year with one of the eight largest steel companies in the U.S.A. and receive technical education at institutions of university status. Though there is no direct connection with railways in this, it is a pointer to future American policy and must contribute to the spreading of American influence in a country whose industrial traditions are largely inherited from Britain. This story may be repeated in other Commonwealth countries now achieving independence. It is for Britain to provide attractive and increased educational facilities. As for purely railway education, the modernised British Railways should provide the finest and most compact training ground in the world.

Safety at Level Crossings

THE recommendations made by a party of officers of the Ministry of Transport & Civil Aviation and of the British Transport Commission in respect of level crossings, published by the Stationery Office last week, point the way to reducing both delays to traffic and the cost of maintaining crossings. As Mr. Harold Watkinson, Minister of Transport & Civil Aviation, recalls in a foreword, the standards of level crossing protection required today generally are the same as were current in the first half of the last century. The provision that public crossings must be manned is now responsible for an expenditure of more than £1,000,000 a year. The report suggests that lifting barriers could be used to replace gates at most attended crossings on lines operated by steam, diesel traction, or electricity on either the third rail or overhead systems, and that automatic and remote operation might be adopted at selected crossings after satisfactory trials. With the introduction of lifting barriers, and particularly if half-barriers—stretching across half the roadway only—are used, the report stresses the need for recognition of the principle that it is the responsibility of the individual to protect himself from the hazards of the railway in the same way as from the hazards of the road. As there are more than 4,250 manned crossings in Britain today, the scope for modernisation and economy is clear.

Prospects in Argentina

THE Argentine national budget estimates for 1957 show that a deficit of pesos 3,390 million is expected on railway operations this year. Expenditure is estimated at pesos 8,640 million and receipts at only 5,250 million. The reasons for this unfortunate position are largely political, and date back many years, but the immediate causes are officially stated to be increased costs, a decrease in carrying capacity, and inadequacy of rates and charges. It is now 11 years, however, since receipts exceeded expenditure. The extent of inflation can be judged from comparison of the total expenditure for 1946, pesos 713 million, with the estimate for the current year. In those 11 years also the number of employees rose from 146,876 to 213,000, an increase hardly justified by a corresponding increase in traffic. Passenger traffic certainly improved—from 282 million journeys a year to 594 million—but goods traffic fell from 35 million tons a year to 28 million, though the average haul increased from 431 km. to 510 km. Reorganisation and re-equipment are now in hand, but the full effect will take some time to emerge.

Higher Charges on the G.N.R.(I.)

THE grant by the Northern Ireland Transport Tribunal of the application by the Great Northern Railway Board for an increase of 10 per cent in the maximum charges for freight and passenger services takes effect from

next Monday; the increases will apply over the whole of the G.N.R., as they have already been authorised in the Republic. There have been no objections to the application, which was the minimum for which the Board considered it could ask. For the year ended September 30, 1956, the deficiency over the whole of the working of the G.N.R. was £1,177,500, of which £688,000 was the amount apportioned to Northern Ireland. The deficit for the corresponding period in 1955 was £989,000, of which £637,000 was attributable to Northern Ireland—a worsening as between the two years of £200,000, the total in the amount apportioned to Northern Ireland being £50,000. On the other hand, passenger traffic—largely no doubt because of the improvement in services effected by introduction of diesel cars and in other ways—was showing an upward tendency before petrol rationing began in December. Given fair treatment from both the Governments concerned, the Great Northern will continue to play an important part in the Irish economy.

Overseas Railway Traffics

SOUTH African Railways & Harbours railway receipts for the period from April 1, 1956, to February 2, 1957, totalled £116,267,084, compared with £115,710,328 for the corresponding period of 1955-56. The figures under the several headings show remarkable similarity between the years: for instance, passengers £16,389,605 (£16,151,030); parcels and mails £3,919,925 (£3,789,251); goods £75,912,159 (£75,325,129); and coal £11,594,610 (£11,778,380). For the same period receipts from harbours were £6,468,959 (£6,363,081) and from airways £6,680,791 (£5,298,263). Paraguay Central Railway receipts for the week ended March 22, were G1,572,774, an increase of G117,899 on the corresponding week of 1956. Aggregate receipts from July 1, 1956, amounted to G70,997,962 against G50,885,797 for the corresponding period of 1955-56.

British Enterprise in Portuguese India

THE West of India Portuguese Guaranteed Railway, the British-owned, metre-gauge railway and harbour undertaking in the territory of Goa, and the impending termination of its working agreement with the Southern Railway of India were the subject of editorial comment in our issue of December 9, 1955. The satisfactory progress that was made in the year ended March 31, 1956, is shown in the report on another page, this week, of the recent annual general meeting of the company. Cessation of through traffic to and from the Indian railway system has meant that the longest possible haul over the W.I.P.R. in Portuguese territory is some 38 miles. In the circumstances, it is satisfactory to see that a policy of improving the maintenance of motive power and permanent way is being implemented with some success. The railway is complementary to the harbour, notably in the export of iron ore, of which the increase in the tonnages handled has necessitated expansion of port facilities at Mormugao.

Pullman Cars in 1956

THE report for 1956 of the Pullman Car Co. Ltd. is the first to cover a period coinciding with the calendar year. Besides relating to a 15-month period to December 31, 1955, the previous accounts covered the period of the 1955 enginemen's strike which cost the Pullman Car Company some £50,000. In these circumstances a strict comparison between the two periods is not possible. Gross receipts for 1956 were £829,999 (compared with £933,160 for 1954-55) and working expenses £694,350 (£774,722); the net profit was £72,159 (£91,427). If the shareholders accept the board's recommendation for the payment of the dividend on the ordinary share capital and after appropriating the preference stock dividends paid during the year, the balance to be carried forward is increased to £272,624 (£253,737). The report, which includes some well-reproduced photographs and a route-map of Pullman car services, states that the board is negotiating with the British Transport Commission regarding the diesel-electric de-luxe Pullman trains referred to in our March 29 issue, and points out that these new services, with the replacement of more than 40 Pullman cars, will represent a notable contribution to the modernisation of British Railways.

Explaining Unpunctuality

LOUDSPEAKER announcements are being made as an experimental measure at some 20 important stations in the Republic of India, explaining, when trains are running late, the reasons why. Some of these, given in an official announcement of the new measure, are rarely met with in Western countries: shortages of locomotive water, breaches of the line by floods and washouts, and—unfortunately epidemic in India—"alarm chain pulling by the passengers themselves." The problem of explaining delays to passengers is simplified in India by the relatively small number of trains usually being dealt with at any one time. On the other hand, at a busy centre in Britain, a harassed traffic staff may find it hard to ascertain the exact cause of a train's being late, let alone phrase an explanatory announcement, there is still, in this country, a tendency to disregard the desire of passengers—and their friends—to know what is happening. On the other hand, we have on many occasions heard clear, courteous, and well-timed station announcements on late running on British Railways.

Taxes on Transport in the U.S.A.

AMERICAN railways, like other public carriers of passengers and freight, are making a determined attempt to obtain abolition of taxes on passenger travel and freight traffic in the U.S.A. The taxes originated as temporary measures in 1940-41. The passenger tax, then 5 per cent on all fares, designed to discourage unnecessary journeys, was raised to 10 per cent in 1942 and to 15 per cent in 1944; it was reduced to 10 per cent in 1954 and, in 1956, abolished for travel to the Caribbean, Central America, Hawaii, and Alaska, also to points more than 225 miles beyond the Canadian and Mexican borders. The maximum fare exemption was also increased last year from 35 cents to 60, thus eliminating it for city travel. The tax on freight charges, namely 3 per cent (or 4 cents a ton for coal) was applied in 1942 and also persists. The Federal Government is anxious not to lose this source of revenue but, as the railways and other carriers point out, it encourages travel by private motorcar and use of privately-owned road transport. The justification for these taxes has long since disappeared; they are regarded by many as a restraint on trade and movement and utterly out of keeping with American principles of free enterprise and free movement within the Union.

Pre-stressed Concrete Overbridges, N.S.W.R.

ON the New South Wales Railways the use of pre-stressed concrete superstructures for road overbridges is now firmly established. To secure the additional head-room required for the electrification of the Blue Mountains section, a number of such bridges have had to be reconstructed. By using pre-stressed concrete in place of the old deep spans, the extra headway is achieved without the road approaches having to be raised, so much shallower construction depth being possible; very considerable economies are thus secured. In the Sydney suburban area also this type of bridge is being used extensively; pre-stressed slabs up to 33-ft. span, 16-in. deep, and 20-in. wide are being used with cross-tensioning to form decks up to 34 ft. wide. The Freyssinet post-tensioning system with cables having twelve 0·20-in. dia. steel wires is established at the Clyde plant near Sydney. Beams up to 42 ft. long and weighing over 5 tons are handled there. Plywood shuttering treated with Formite is generally used, and also Ductube cores for the cables; immersion vibrators are standardised. A minimum compressive strength of 5,000 lb. per sq. in. after 28 days is

laid down for the concrete. All bridges are up to Main Road Class A loading; some of them are constructed on skews of as much as 40°.

Perpetuating the Name "Caledonian"

THE Caledonian Steam Packet Co. Ltd. was formed in 1889 to operate the shipping services of the Caledonian Railway Company; it has continued to exist despite the far-reaching changes caused by grouping in 1923 and nationalisation in 1948, though its identity has tended latterly to be lost through the shipping interests of the former railway companies in Scotland becoming known as Clyde Shipping Services. In accordance with its policy of preserving Regional identity, the British Transport Commission, after consultation with the Scottish Area Board, has decided that the traditional packet company is to be the organisation through which its steamer and ferry services in Scotland shall be controlled. Accordingly, all B.T.C. vessels on the Firth of Clyde and Loch Lomond, and the Kyle of Lochalsh/Kyleakin ferries will henceforward sail under the flag of the Caledonian Steam Packet Co. Ltd., which is managed by a board of directors on behalf of the Commission, with Mr. James Ness, General Manager of the Scottish Region, as Chairman & Managing Director; Mr. Alexander Stewart, at present Manager of Clyde Shipping Services, will be General Manager of the Caledonian Steam Packet Co. Ltd. and responsible for day-to-day operation of services.

Helicopter Aids Overhead Cable Laying

EXTENSION of electrification on the German Federal Railway made it necessary to carry the 110,000-V. transmission lines across the Rhine at Remagen, where it is some 980 ft. wide, with a span between pylons of 1,873 ft. to give the minimum height of 82 ft. at the lowest point, as required by the river navigation regulations. The pylon on the left bank is 227 ft. high and the opposite one, reckoning also the height of the rising ground on which it is placed, 311 ft. An earth safety cable and a multi-core telephone cable had also to be taken over, in addition to the power wires proper, which included a pair of 15,000-V. industrial feeders besides those serving the railway. The usual course of employing barges and winches to work the first cable across was considered objectionable, not only as interfering with river traffic but also on account of the local topographical conditions, and it was decided, therefore, to use a helicopter to carry a 5-mm. dia. perlon messenger rope over the stream where it was passed immediately to men on the pylon who drew it up into position. This was in turn used to haul across a steel cable of similar size, after which another somewhat larger was drawn over, and finally one of the transmission cables themselves was satisfactorily brought into position. This weighed 1·8 *tonnes* between pylons.

A Tribute to North London Signalling

IN his address on April 13, at the visit of the Railway and Canal Historical Society to the route of the former North London Railway, Mr. H. V. Borley spoke of the excellent safety record of the line, which carried a very heavy passenger and goods traffic. In its most prosperous period the signalling, which was entirely mechanical, was of L.N.W.R. pattern, as regards the principal items, with Webb type lever frames, although his locking actuation and mechanism eventually gave place to the direct tappet type. The three-wire block telegraph was to the designs of H. J. Pryce, the Locomotive Engineer, and L. M. G. Ferreira, the Telegraph Inspector, later a distinguished figure in the signalling industry. Very few accidents fell to be recorded and fewer still attributable to signalling irregularities. The one usually thought of in connection with the line, in the Canonbury tunnel on December 10, 1881, although involving N.L.R. trains, took place on G.N.R. metals, and arose from a mistake of a G.N.R. signalman, to which differences between the two companies' block regulations contributed.

B.T.C. Supplies Organisation

THE supplies and production organisation of the British Transport Commission is to be revised in the light of the heavy calls which are being made on it in connection with the railway modernisation programme. Details of the new scheme are not yet available, but the Commission has announced that it has recently reviewed the organisation of the supplies side of its business, which has remained virtually undisturbed since the time of the Railway Executive. There can be no doubt that because of developments which have occurred since that time, there has been need for a review of this part of the structure. It has become more necessary in view of the increased powers of financial discretion accorded to Area Boards and to other parts of the organisation. The greater expenditures which the Area Boards have been authorised to make have been effective in enabling more prompt action to be taken on a number of important matters, and have reduced the time which otherwise would have been occupied in arriving at decisions. Similarly, the increasing decentralisation in authority which has been made effective has been reflected in a better and a more flexible approach to a number of problems which must arise in dealing with supplies and production for so large-scale an organisation as British Railways.

The new scheme, which has been accepted in principle by the Commission, provides for a separate Contracts Branch. The responsibilities of the Supplies & Production Adviser, a position which was created in June, 1955, will be absorbed by the other advisers to the Commission, by the Chief Supplies Officer and in the new Contracts Branch. It is for this reason that, as was stated in our last week's issue, Mr. E. L. Gethin, who has been Supplies & Production Adviser, is leaving the service of the Commission as at the end of May.

One of the advantages which should flow from the creation of the Contracts Branch should be to lighten the burden on technical officers, such as Mr. S. B. Warder, the Chief Electrical Engineer. There can be little doubt that this must be an advantage at the present time when there are so many pressing problems connected with the electrification programme to be dealt with, and a real need for concentration of attention on technical matters not necessarily directly associated with production and supplies.

As the development programme gathers momentum—and it is noteworthy that so far it is keeping well up to date—there will be an increasing field of usefulness open to the Contracts Branch. The very weight of supplies and production which will be required and the speed of decision which will be necessary, should justify any steps which may have to be taken to avoid the danger of a bottle-neck which might otherwise arise as a result of the volume and diversity of work which will have to be handled.

Opportunity in South Africa

THE series of British Trade Weeks to be held in South Africa this year, the first of which starts in Cape Town on Monday, is designed to remind both countries of the strong trade ties between them. One of the longest and strongest of these ties is in the field of railway equipment, for the first railway to be built in South Africa, at Durban, was opened nearly a century ago, in 1860. The immediate occasion of the Trade Weeks is the 50th anniversary of the foundation of the British Manufacturers' & Representatives' Association in South Africa, and the Weeks are sponsored by the Federation of British Industries and the B.M.R.A. with the support of the Board of Trade, the Commonwealth Relations Office, the Central Office of Information, the British Council, the British Travel & Holidays Association, the British Overseas Airways Corporation, the Union-Castle Mail Steamship Co. Ltd., and British industrial exporters. The Durban week will be on June 10-22 and that in Johannesburg is to be held later in the year on September 17-28.

After the last war, South African Railways & Harbours were faced with demands for considerable extra services. Mining, agriculture, and industry in general were entering a period of expansion which was to raise the value of industrial production from £675 million in 1947-48 to more than £1,300 million in 1955 and almost double agricultural production in 10 years. To meet these demands, a large-scale programme of modernisation and improvement was undertaken by the railways, particularly as regards track improvements. In the 10 years from April, 1945, to March, 1955, £93 million was spent on the track, £56 million on goods vehicles, and £36 million on steam and electric locomotives, apart from large sums on other equipment. Prominent among British locomotive builders who have supplied and are supplying motive power to South Africa is Beyer, Peacock & Co. Ltd., which supplied its first 2-ft. gauge Beyer-Garratt steam locomotive to South Africa in 1921 and has just delivered 35 "GMAM" class Beyer-Garratts to the S.A.R., with a further 60 of the class on order. In recent years, the North British Locomotive Co. Ltd. also has supplied large numbers of steam locomotives to railways in the Union, including 100 4-8-4 class "25" locomotives which were ordered as recently as 1951. The same company has produced a number of large locomotives for industrial concerns in South Africa.

The policy of the South African Railways seems to have crystallised into a form calling for electric traction where traffic is sufficiently dense, diesels where coal and water are scarce, and steam traction elsewhere. Although the days of steam locomotives obviously are by no means over, the administration has been forced by the falling water table in South Africa and the increasing cost of coal to consider diesel traction, of which it has no experience except for two diesel shunters which have been working since 1939. The 200 units which are envisaged as a first stage towards diesel traction are likely to include 60 main-line locomotives of perhaps 2,000 h.p. to work from De Aar to Beaufort West across the Karroo, and also into South-West Africa. Tenders for up to 50 diesel-electric and 10 diesel-hydraulic locomotives have been issued, and no doubt British builders have made competitive bids for this important order—heralding a new phase in South Africa. In the meantime, diesel locomotives supplied to industrial concerns by the English Electric Co. Ltd., Hudswell Clarke & Co. Ltd., and the Hunslet Engine Co. Ltd., among others, have shown something of the products of British manufacturers.

Many electric locomotives have been supplied by British manufacturers. The Metropolitan-Vickers Electrical Co. Ltd. supplied the first electric locomotive to South Africa and more than 200 others have followed. The 3,030-h.p. "4E" class electric locomotives built by North British in partnership with the General Electric Co. Ltd. are a familiar sight in the Cape, and the smaller "5E" class, 60 of which have been built by English Electric, are equally familiar in Natal. The S.A.R. need many more locomotives of this type. Multiple-unit electric stock also has been built in Britain for the Union and Metropolitan-Vickers has supplied large quantities of electrical equipment for such stock, including that for 349 coaches ordered in 1955 from the Metropolitan-Cammell Carriage & Wagon Co. Ltd., some of which were sub-contracted to the Birmingham Railway Carriage & Wagon Co. Ltd. The Metro-Cammell connection with South Africa is of long standing. The company has supplied nearly 200 coaches of various types since the war and more than 3,000 bogie drop-sided wagons. Among its products are the coaches of the "Blue Train," which has now been running for nearly 20 years, and the "White Train" built for the Royal Visit to South Africa in 1947. Many wagons have been supplied also by Dorman Long (South Africa) Limited.

In other branches of railway manufacturing, such as the supply of signal equipment, British companies have played an important part. All of the contracts mentioned have been gained on the open market in competition with the rest of the world, for Great Britain has no privileged position in the South African market. With such a history of achievement, there can be no doubt that British manufacturers deserve well of, and will serve well in the future, the expanding railway system of South Africa.

Protection for Concrete Piles in Tidewater

A PROBLEM that is exercising the minds of many engineers is the deterioration occurring in concrete-pile structures partly immersed in tidal waters. From the following examples it would seem that those in America have successfully solved it. The effect of tidal water in the New York area is clearly shown by the condition of Canarsie Pier. Of its 1,002 14-in. square pre-cast piles driven in 1925, 772 showing serious disintegration had to be repaired in 1953 and in 1955 only 28 of the original piles were in serviceable condition; 97 per cent thus required extensive repair. The specified mix of the concrete was ½ trass: 1 Portland cement: 1½ sand: 2½ gravel.

On the other hand, 3,500 24-in. R.C. pre-cast piles in Cross Bay Boulevard Viaduct washed by the same tides were still in excellent condition after 33 years in service. It is true that the mix in these piles was 1:1:2 and that they were treated with bituminous paint in the parts affected by the tidal water, but their preservation is claimed, with ample reason, to be due to their being encased in creosoted pine planks. This jacketing consists of double layers of 2-in. yellow pine planks 10 ft. long—extending from 2 ft. below L.W.L. to 3 ft. above H.W.L.—clamped to the piles with ½-in. × 2-in. galvanised wrought iron strips. The timber was pressure-treated by the full-cell process to a retention of 16 lb. of creosote per cu. ft. The treatment ensures both immunity from decay in the timber above the water and protection against marine borers in it.

In another viaduct in the same vicinity and inspected last October by the American Wood Preservers Institute, the jackets on 1,303 piles were found to be still sound after over 30 years in the tidewater; the only defects were that 30 of the jackets had slipped down to the extent of from 2 ft. to 8 ft. In fact, the Institute has inspected about 6,000 pre-cast concrete piles in tidal water along the south shore of Long Island. With a few exceptions all piles protected with jackets were in good condition.

Such protection appears to be standard in the specifications for recently-constructed viaducts in the New York area. One is on the New York City Transit System across Jamaica Bay to the Rockaways, opened in June, 1956, and described in our issue of November 9, 1956. Here 800 jacketed piles were used, but the casing is a single layer of 3-in. planks extending from 2 ft. below L.W.L. up to the underside of the capping girders. In another new bridge, 658 piles were jacketed with timber pressure-creosoted to a retention of 20 lb. per cu. ft.

Long Welded Rail Investigations

SINCE 1954 the Western Region of British Railways has been carrying out valuable investigations into the behaviour, control, and economic factors relating to long continuous lengths of welded rail. They take the form of two test lengths of track examined in detail under different conditions and also searching laboratory tests. The first test length was at Llanwern on a straight goods loop laid on indifferent formation but carrying heavy traffic at speeds limited to 10 m.p.h. The second is at Treforest on sharp reverse curves over which 40-mile speeds are permissible. Each length consists of two continuous half-mile or shorter half-lengths composed of 300-ft. rails—previously welded from 60-ft. rails at Redbridge depot, Southern Region—Thermit welded at site. Breather switches are provided between the two half-lengths and at their outer extremities. In both cases the long welded 109-lb. or 98-lb. F.B. rails are in one track of a double-line section of which the other road consists of conventional jointed track, so that direct comparison is available between the two types of track.

Details of these long rail lengths, their laying in, and —most important—the different kinds of fastening used,

as well as notes on the maintenance, rail temperatures, automatic recording apparatus, destressing movement and general behaviour of the track are all embodied in Railway Paper No. 65 presented to the Institution of Civil Engineers on March 12 by Messrs. K. D. Rhodes and M. R. Dart. Laying-in and maintenance costs compared with those of standard jointed track are also referred to in this paper, and the static and dynamic laboratory tests are described in detail. Also described and illustrated is a 120-ft. length of track tested to determine loss of resistance to buckling induced by the application of electric fires to the rails with various standards of maintenance and different quantities of boxing ballast to assist in the control of the alignment.

It is noteworthy that the test lengths of long welded rail in South Wales were subjected to apparatus for measuring and recording movements of the rail in three mutually perpendicular planes developed by the Soil Mechanics Laboratory. Nine pairs of instrument stations 100 yd. apart were initially established with recording instruments grouped at a central point. The corresponding 18 monuments were founded on bored piles sunk to sandstone bedrock. The 50v.-30 A. a.c. supply for this apparatus was taken from the B.E.A. grid; one of the instrument stations is illustrated in the paper. The behaviour of the track recorded was mainly longitudinal movement due to changes in temperature but transverse movement was also registered. In the laboratory the principal static tests were for resistance to longitudinal movement of a rail through its fastenings, and a dynamic testing machine was also evolved for equating track loading and deflection under the equivalent of the passage of a locomotive at 60 m.p.h.

However, the conclusion reached by the authors was that as it had not yet been possible to relate data from the laboratory tests to practical conditions, further data was being obtained and analysed. Meanwhile, it is more than ever clear from the tests already made that long continuous rail lengths carrying fast traffic must be provided with ample ballast and a firm foundation, and that good packing is essential. Also that maintenance must be to a first-class alignment and special attention must be paid to the maintenance of the fastenings. Incidentally, the extra weight of the concrete sleeper was shown to be a distinct advantage, though further investigation with regard to the most efficient type of fastening for this sleeper was obviously necessary. More accurate means of costing maintenance will also have to be devised for ascertaining the economics of long welded rails. Although these and other additional investigations will have to be made before more positive information is available, it is satisfactory to know that this important problem is being scientifically considered with such thoroughness. Meanwhile, Western Region has laid lengths of long welded rail on a number of sections carrying all types of traffic, and the 1957 programme includes a further 13 miles.

The U.S.A. Railway Position

LAST year opened in promising fashion for the U.S.A. railways. For five months to May, freight receipts were 10·6 per cent higher and passenger receipts, long a diminishing amount, rose by nearly 2 per cent. Mail produced 1·5 per cent more revenue and, though parcels receipts were 1·2 per cent lower, total operating revenues increased by $382 million, or 9·6 per cent. Then came a heavy change. June was a lean month for freight traffic and, when labour troubles closed down most of the steel works for the month of July, freight revenue dwindled until the heavy loading period in October. By the end of 1956 the increase in total operating revenues was about $444 million, or 4·4 per cent. Meantime wage rates for all employees had advanced by 8 per cent on 1955 and the prices of all materials, including coal and oil fuel, were at least 6 per cent higher. Operating expenses advanced by $467 million, or fully 6 per cent, while taxation also increased by $40 million, or 3·7 per cent. Net railway operating income, or earnings before charges, was thus reduced by $61 million, or 5·4 per cent, and represented a return of 3·95 per cent on railway property investment, against 4·23 per cent for 1955.

No signs of an improvement in the railway position could be detected during the opening weeks of 1957. In seven weeks to February 16 wagon loadings numbered 4,554,490, a decrease of 221,920, or 4·6 per cent, from last year. Grain loadings were up 10 per cent because the United States Department of Agriculture is moving large stocks of old grain from interior places to terminal markets and ports so as to free granaries for the new crops. Ore was the only other commodity to be forwarded in larger quantities than in 1956. Coal loadings were hampered by floods in the Pocahontas region towards the end of January and were 8 per cent down from last year, though still 6 per cent above 1955. In January 4,500,000 tons of export coal were shipped against 3,900,000 in 1956 and monthly shipments of 4 to 5 million tons are expected to continue for some time. On the other side of the account, 87,960 fewer wagon loads of general merchandise were forwarded, a decrease of 4 per cent, in the first six weeks of the year, while less-than-wagonload traffic dropped by 10 per cent.

The downward trends in railway movement of freight point to some slackening of industrial activity in the United States. The set-back may be temporary, but it is significant that coal stocks on January 1 were 10,000,000 tons larger than a year earlier and that weekly coal output has run recently at 9 or 10 per cent below last year's level. Steel plants have not been producing to full capacity, partly because motor manufacturers have reduced orders for steel plates. Wintry weather in several states has lessened crops of fresh fruit and vegetables, but the output of frozen foods is growing rapidly enough to keep the stock of refrigerator wagons well employed.

If a fresh upsurge in general business happens soon, the railways will have at least 21,000 more serviceable wagons to cope with extra traffic than they had last year. The number of wagons under repair is being held down to about 4 per cent of the total stock, and on February 1 the number of new wagons on order was nearly 105,000. On the same date the railways owned 26,320 diesel locomotive units, with less than 1,000 under repair, and had 787 new diesel units on order. In the previous 12 months they retired 2,230 steam locomotives and now retain only 3,000 in active service. Ten years has sufficed for a complete revolution in motive power.

Marshalling Yard Problems

A PHASE of railway operation to which the signal engineer has had in the course of time to give increasing attention was dealt with in the paper read by Mr. D. C. Webb before the Institution of Railway Signal Engineers on March 19, when he reviewed the problems connected with the efficient working of marshalling yards and the application of the latest developments directed to integrating the effects of the various factors met with and endeavouring to substitute automatic methods for human judgment. The marshalling yard made its appearance relatively early in the history of railways, for as the progress of the industrial revolution brought more and more freight to them attention began to be turned to the question of how to effect shunting efficiently and eliminate waste of man- and locomotive-power. Gravity operation of sorting sidings, combined with certain more or less primitive forms of controlling and stopping the individual wagons as they travelled into the sidings to which they belonged, appeared in the last century, but for some time no attempt was made to use anything but manual operation for the points or apply more than the very simplest types of signalling, and then only to a limited extent. A considerable labour force was necessary to work a yard under these conditions, while the tasks of many of the staff were not only arduous and disagreeable, especially in bad weather, but accompanied by some danger.

With the appearance of reliable power signalling, how-

ever, a noticeable improvement was made in certain important respects. Specially designed mechanisms allowed points to be actuated with great rapidity and a much better control over the work of sorting vehicles to be obtained. Once this step had been taken the way was opened to dealing with the very difficult problems associated with the management of the moving vehicles after their direction to the correct line had been effected, and here new principles had to be applied, unlike any the signal engineer needed in order to deal satisfactorily with ordinary traffic working on running lines. To arrive at really effective results in this direction much research and experiment of course was required and the risking of a good deal of capital, but a number of minds applied themselves to the task in several countries and the consequences were seen in the development of retarders, or rail brakes as some called them, various types of locally operative brake shoes, certain cable haulage devices, the automatic control of at least the principal sets of points at the approach to the sorting sidings, with storage of controls in advance, as originally introduced for train describers, with other improvements, all of which were applied on an appreciable scale, with a most gratifying measure of success, between the two wars. It is impossible not to admire greatly the high level and amount of the scientific knowledge and extensive and patient research which was—and indeed still is being—brought to bear on what is indisputably a key problem in the process of modernisation of railway working, going forward today in so many countries. The highly variable character of the numerous factors entering into the problem creates perhaps a wider gap than usual between theory and practice in this branch of engineering. Not only do weather conditions play a large part in the picture but the weight and type of construction of the individual wagon and its load, combine to introduce elements difficult to assess. It is essential to effect marshalling not only with celerity but without damage to wagons or their contents and whether this can be completely achieved has, we imagine, yet to be seen, although admittedly very much has been done towards it, while the development of electronic and radar devices has provided additional tools with which to attack the problem and much valuable progress has been made in applying them. As the discussion on Mr. Webb's paper showed, opinions still are divided on some important points and should the ideal of totally automatic operation prove not universally attainable it is certain that the working of our yards will be further improved and contribute much to that greater general efficiency at which we are aiming.

LETTERS TO THE EDITOR

(The Editor is not responsible for opinions of correspondents)

Locomotives or Multiple-Unit Sets?

April 12

SIR,—I entirely agree with Mr. P. Weil (your issue of April 12) that the centre of gravity of a motor-bogie must be as high as possible to achieve good riding.

By the use of bolsterless bogies, integral body construction, and so on, it ought to be possible to raise the centre of gravity of a bogie carrying traction motors by several inches. However, my own solution would be to remove the motors from the bogies, and mount them under the centre of coach, with cardan shaft drives, somewhat like the arrangement in the diesel railcar; a.c. motors could then be used if desired, and cooling and accessibility improved, apart from better riding. Only two motors per coach would be used.

Yours faithfully,

JOHN RODGERS

132, Worrin Road, Shenfield, Essex

April 11

SIR,—With reference to Mr. T. R. Hume's letter in your April 5 issue, whilst apparently there is no concrete proof that multiple-unit d.c. stock does serious damage to the track, it is quite certain that the heavy axle-hung d.c. motors do have some bad effect. I was hoping that with the advent of a.c. traction, we would see some a.c. motors on multiple-unit stock, which would of course be considerably lighter than d.c. motors at present being used.

To many people, the fact that the a.c. traction motor is generally lighter than the d.c. motor may be surprising, but proof of this can be obtained by looking at tabulated lists of both a.c. and d.c. motors which have appeared from time to time in the technical press.

In your editorial note in the same issue, you state that the 3,300 h.p. which will be available on the new locomotives, should be enough to deal with any trains at present envisaged. It all depends at what speed this h.p. is available. I am a little disappointed that no type of locomotive has been ordered other than those you mention. I would have thought that one or two converter locomotives would have been put into service. Amongst the advantages of this type of locomotive is the ability to give out the full output of the locomotive over a very wide vehicle speed range, including the very high speeds. Its high adhesion factor should, of course, be well known.

Another advantage of the converter locomotive is that it can possess a very high degree of power factor correction, in fact, if the traction load consisted largely of vehicles of this type, then it appears to me that the very high voltage of 25,000 would not be necessary in this comparatively small country. If, for instance, the voltage could be dropped to 11,000 then the converter locomotive could be designed to operate without a main transformer.

Yours faithfully,

HERBERT CHARNLEY

Brook House, Clayton-le-Woods,
near Chorley, Lancs

April 5

SIR,—If Mr. T. R. Hume (whose letter appears in to-day's issue) would care to take a trip by one of the fast 1-hr. electric expresses between London and Brighton, I think he will obtain proof enough that the claim that heavy, really fast multiple-unit traffic is detrimental to track and bogies is fully justified. If he will compare such a trip with one on a locomotive-hauled main-line express, he will surely note the vast difference in the quality of the riding. It may be apt here to say " the proof of the pudding is in the eating."

Need we at this juncture start a discussion on a point which is really elemental and which has come to be accepted almost as an axiom? After all, that is what the acknowledged bad riding of fast multiple-unit stock can be classed as. For suburban traffic it is still the best solution, but for main-line express work there can be no doubt of its serious drawbacks. The fact that the new British Railways 3,300-h.p. express and mixed-traffic electric locomotives are to be equipped with fully-suspended motors, mounted on the bogie frames, with fully-flexible drive to the wheels, instead of the usual axle-hung motors (to quote your Editorial Notes), proves that the British Railways management recognises the unsuitability of axle-hung motors for this class of work. Unfortunately, as I pointed out before, this principle cannot be applied to multiple-unit stock, because of lack of the necessary head-room for the higher-placed motors and gears.

Yours faithfully,

P. WEIL

49, The Drive, Hove, 3, Sussex

THE SCRAP HEAP

Aural Evidence

A German motorist is being supported by the West German Automobile Club in an appeal to a district court against a sentence of 10 days' imprisonment or a fine of 100 marks. The motorist was sentenced for negligence in failing to dismount at an unguarded level crossing and put his ear to the rail to hear whether a train was approaching.

Link with the Past

The death has occurred, at Leigh-on Sea, of Thomas Sutton, aged 88, believed to be the oldest railway engine driver in England. On different occasions he drove the Duchess of Kent, mother of the late Queen Victoria, as well as Queen Victoria herself (who often bestowed upon him a gracious smile at the safe completion of a long journey), the late Prince Consort, the present King [Edward VII] when His Majesty was a boy, and many other celebrities.—*From "The Evening News," April,* 1907.

Gregarious Albion

British Railways . . . are telling the prospective American traveller that he or she will meet, in a British railway train, "fascinating, genial people." No highfalutin nonsense, be it noted, about these people being lords or, at lowest, honourables. They are just ordinary folk and—so British Railways assure their customers-to-be—in these magical, mythical trains, "everyone talks with everyone." But . . . be assured that, when you find yourselves on an English country station with six waiting English passengers, they will choose instinctively, as the train draws up, six empty compartments. Horrible, gregarious garrulity, with which the advertisement has saddled them, is not among their many faults.—*From "The Times."*

Ravine for a Railway

An artificial ravine, 180 ft. wide and half-a-mile in length, has been created by an explosion in Siberia, according to Tass, the official Russian news agency. Some two-and-a-half months were spent in digging 45 holes, each 60 ft. in depth, and a charge of 1,200 tons of ammonal was planted. The work was undertaken to clear a path through a hill for the new Taishevsk-Lena railway.

Railways in the Rue Morgue

Freeman Wills Crofts, having been a professional railwayman and remaining an absorbed amateur to the end of his long days, could not help instructing his readers in standard railway procedure in nearly half his detective stories. . . . It was in "Death of a Train," that he really let himself go. This was the one wartime spy thriller of the series and it turned on the need to send secretly stores of irreplaceable value to the army in Egypt. They had to go from Basingstoke to Plymouth and in covered wagons of a particular type. First the Railway Executive Committee had to order the train. Then the Southern Control had to find the wagons, dotted all over the system, and assemble them at Basingstoke. An engine and crew had to be provided, and a path in the timetable found for the train. Saboteurs then staged a tremendous railway crash near Exeter, mercifully of the wrong train, and then we have a detailed description of a Ministry of Transport inquiry.—*From "The Manchester Guardian."*

Organists of Cannon Street

. . . And so it is with the points and signal levers of the Cannon Street platform. The whole row may be considered to form a keyboard of five-and-a-half octaves, every key of which is connected by suitable cranks and rods to some one of the 67 points and semaphores which have to be played upon. In the organ a touch of the finger serves to depress a key, for the movement has only to admit a puff of air to certain pipes—but here the keys require a strong and steady pull, for they have to move ponderous point bars, or broad semaphore arms, and their movements have to be conveyed round many corners and over considerable distances.—*Frederick S. Williams in "Our Iron Roads"* (1884).

First Love—Last Love

When you're still a kid, and the future's hid
And you jib a bit at the rein,
Your young heart glows when a whistle blows—
There is something about a *train.*

When you're older, too, and the chores you do
Seem to go against the grain,
You long for a flag, like a guard's, to wag—
There is *something* about a train.

When you're travelling far in a leaky car
And it pelts like mad with rain,
And you sadly sigh to be home and dry,
There *is* something about a train.

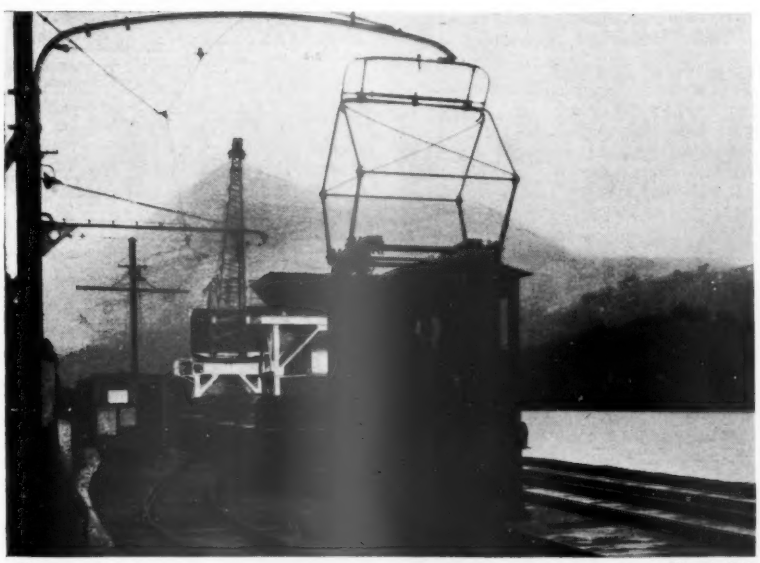
When the buses strike and it's "walk or bike,"
And you wilt with stress and strain;
When your knee-joints creak and your legs go weak,
There is *something* about a train.

When you're going grey and time slips away,
And ambition beckons in vain;
When you've little need for excessive speed,
There *is* something about a train.

When my good friends prate that I'm out of date,
I am proof against their disdain;
I may find small joy in their latest toy,
But—*there's something about a train*!

A. B.

Industrial Electric Railway in the Highlands



Photo] *[Dennis Gill*

Locomotive and four-wheel wagons of the British Aluminium Company electric railway on the pier at the head of Loch Leven

OVERSEAS RAILWAY AFFAIRS

(From our correspondents)

NIGERIA

Railway Out-Agency at Maiduguri

The Nigerian Railway Corporation proposes to establish an out-agency at Maiduguri, in Northern Nigeria. This out-agency, which will connect the Bornu area with the railway at Jos and Bukuru, will facilitate the transport of goods and benefit producers operating far from a railhead. The object is to link the railhead with the surrounding districts by road services co-ordinated with the railway. Goods will then be through-booked from Maiduguri to any station on the railway, and vice versa.

PAKISTAN

Institute of Engineers Convention

Mr. S. M. Hasan, Director General of Railways, who has been elected for the second year in succession President of the Institute of Engineers (Pakistan), delivered the presidential address at the Fourth Annual Convention of the Institute held recently at Karachi. The convention was inaugurated by the Prime Minister, Mr. H. S. Suhrawardy.

NEW ZEALAND

Tangiwai Disaster Memorial Unveiled

Three years and three months after the railway disaster when the bridge over the Tangiwai River collapsed under the Wellington-Auckland express resulting in the loss of 151 lives, the Prime Minister, Mr. S. G. Holland, unveiled a tablet at the head of the mass grave in Karori Cemetery, Wellington, on which the names of all those who are known to have died in the disaster are inscribed.

With Mr. Holland were the Leader of the Opposition, Mr. Walter Nash, members of Cabinet and members of the Diplomatic Corps, the General Manager of Railways, Mr. A. T. Gandell, and representatives of the three railway associations.

Among the survivors present were two of the central figures and heroes of the rescue operations, Mr. J. W. Holman, one of the passengers, who was awarded the George Medal, and the guard of the train, Mr. W. I. Inglis, who was awarded the British Empire Medal for his bravery at the time of the accident.

ISRAEL

Beersheba-Eilat Line

Work is starting on construction of the railway from Beersheba to Eilat, referred to in our March 29 issue. The first stretch to be built is that from Beersheba to Dimona, 20 miles. From the latter place the construction is envisaged of branches to phosphate mines and potash works in the area. Apart from the development of the port of Eilat, on the Gulf of Akaba, the new line will open up the natural resources of the Negev.

UNITED STATES

Indoor Diesel Servicing

The Union Pacific Railroad recently has brought into service at Council Bluffs, Iowa (adjacent to the city of Omaha), a new shop in which the entire day-to-day servicing of diesel units is carried out under cover. The shop, 263 ft. long by 187 ft. 4 in. wide, is divided into two by a central machine shop area, which is flanked on either side by three tracks, each long enough to accommodate four diesel units simultaneously. The usual elevated and depressed working platforms are provided, with track pits, the rails being carried on pedestals. The building has a steel frame, concrete block exterior walls, glass block windows, and a steel roof deck; fireproof materials alone have been used in the construction. The entry doors to each track are moved by remote push-button controls.

Fuel service lines, with leak-proof nozzles to reduce fire risk hazards, are installed throughout the building, together with service lines for sand, fresh lubricating oil of two different qualities, used lubricating oil, plain and distilled water, water for heating boilers and drained water, steam and compressed air, with the pipe lines in distinctive colours for ready recognition. All these service lines are available to diesel units at each of the 24 standing positions, which also are provided with 66 exhaust hoods to carry away diesel engine fumes. The most difficult design problem was that of the sand supply, which is by compressed air through 28 outlets to the side, front and top sandboxes of diesel units in any position. The total cost of this "lubritorium," as it is called, was $2,000,000.

CANADA

C.N.R. Diesels at Chicago

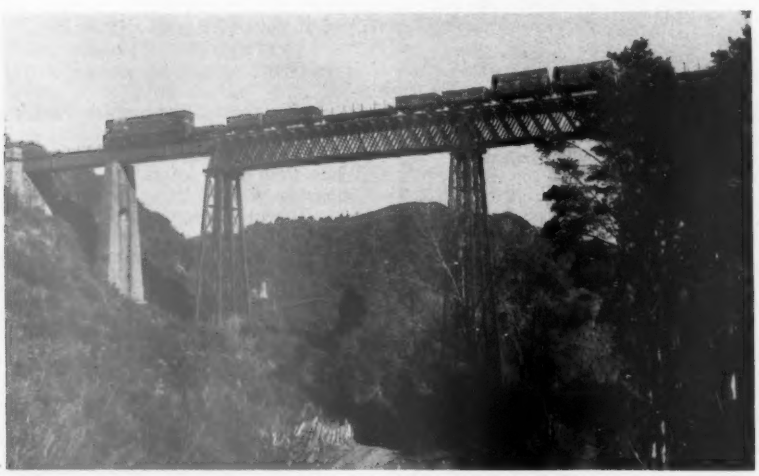
The first international passenger train in Canadian National Railways service to be hauled by a diesel locomotive, the "Maple Leaf," recently completed its run from Chicago to Toronto. The front end bore the insignia of the Grand Trunk Western, one of the C.N.R. American subsidiaries. Diesel haulage to and from Chicago is consequent on that between Toronto and Montreal.

BRAZIL

Federal Railway Reorganisation

The Federal Minister of Communications and public works has replied to criticisms of Law No. 3115, of March 16, converting the railways belonging to, or administered by, the Federation into joint stock companies under the co-ordinating body, Rede Ferroviaria S.A. (RFFSA) (see our March 22 issue). The situation of these railways, he has stated, has become untenable as the majority have not been earning enough to pay one-third of their staff salaries. The 11 systems subordinate to the

Diesel Freight Working in New Zealand



Freight train hauled by "Da" class diesel-electric locomotive crossing Waiteti Viaduct, on the North Island trunk line

National Railway Department accumulated a deficit of 4,400 million cruzeiros (say, £24·4 million) in 1946-56 and, with the increased wages and bonuses granted in 1956, the 22 Federal Railways closed their accounts at December 31, 1956, with a deficit of 12,000 million cruzeiros.

Among the major defects reported are the managements' lack of control over employees, undue dependence on higher authority, and subjection of all lines to the same general legislation and political interference.

President Kubitscheck has vetoed what was generally considered the most disadvantageous feature of the law as approved by Congress, that which transformed all railway employees into public functionaries, which would have increased further the enormous number of civil servants in Brazil.

FRANCE

Motive Power Depot at Les Aubrais

The new locomotive depot and workshop at Orléans-Les Aubrais has been designed specifically to handle electric and diesel motive power. At Les Aubrais, besides normal running maintenance on all motive power allocated to the depot, general and intermediate maintenance are carried out on electric locomotives and on diesel shunting tractors. There are buildings for administrative services, a staff hostel, and a training centre for apprentices, also an automatically-operated sand-drying plant which can treat 425 cu. yd. of sand a month, and supply sand to 19 other depots in the South Western Region.

Electric Signalbox at Compiègne

A new central all-relay electric signalbox of the most modern type has been brought into service at Compiègne, Northern Region. It controls 40 sets of points and 34 signals, and is connected with nine satellite boxes. Sixty-six different routes can be set up by 59 shunting button controls and 28 auxiliary switches.

DENMARK

Crossing-place on Masnedø

On the line from Copenhagen to Gedser there are two tracks as far as Vordingborg. Thence to the next station, Orehoved, there is a single-track section of some six miles, including the two-mile long Storstrøm bridge. As traffic by this route has been growing very much since the war, mainly as a result of the opening of the Gedser-Grossenbrode ferry with its many international trains, it has been found necessary to place a crossing-place station between Vordingborg and Orehoved on the island of Masnedø. Here a 2,300-ft. running loop has been constructed. This new station is without personnel. Signals and the points are controlled remotely from Vordingborg. This stretch of the line has been equipped with automatic signalling, but it was not possible to install the usual pattern because of the safety measure taken to prevent fire on the Storstrøm bridge, which practically made the use of track circuiting impossible. It was therefore necessary to use axle counters.

WESTERN GERMANY

New Numbering of Reserved Seats

A new method of numbering reserved seats in trains will apply as from the commencement of the summer service. Seat numbers will consist of two digits, the first one indicating the number of the compartment, the second one that of the seat. Thus, 34 will be seat No. 4 in the compartment No. 3 of the coach.

New Electric Locomotives

The first of a new series of Bo-Bo electric locomotives (E 10.100) have been put into service in the Karlsruhe district.

NETHERLANDS

Flushing Branch Electrified

Although, as recorded in our April 12 issue, electric services, on new schedules, will be introduced between Roosendaal and Flushing with the summer timetable, electric trains began to run over this line on April 18, but without alteration in the present timings.

Publications Received

Induction and Dielectric Heating.—Electricity and Productivity Series No. 6. London: British Electrical Development Association, 2, Savoy Hill, W.C.2. 9 in. × 5¼ in. 191 pp. Illustrated. Price 8s. 6d.—This book has been written for both technical and non-technical management executives, and will remove much of the mystery which surrounds modern methods of electrical induction and dielectric heating, and show their essential simplicity from the production engineer's point of view. The 12 chapters deal respectively with induction melting of metals, induction heating for metallurgical purposes, mains frequency heating, surface hardening by high frequency, surface hardening light engineering applications, through heating, annealing and tempering, brazing soldering and welding, dielectric heating, dielectric heating for plastics, and dielectric heating in woodworking.

A.E.G. Activities.—Allgemeine Elektricitäts-Gesellschaft, Berlin-Grunewald, has brought out a handsome publication entitled "Aus Produktion und Entwicklung," in which its many activities over the last two years are described and illustrated. Traction developments are well featured; types of electric locomotive built by A.E.G. which find a place include a Bo-Bo+Bo-Bo twin-unit for a single-phase a.c. 6-kV., 50-cycle industrial line, and the German Federal Railways "E10" type Bo-Bo locomotive and "ET30" three-car electric set; the all-sleeper multi-car diesel "gliedertriebzug" for the German Sleeping & Dining Car Company also appears. The publication runs to 92 pages, profusely illustrated, and is bound in cloth; the price is DM 11.70.

Continuous Cleaning Ventex Air Filters.—A brochure describing the development of automatic cleaning air filters has been produced. The Ventex units are self-contained. The area of the cleaning surface exposed to the air flow is stated to be 45 times the face area, and the patented design of the elements together with method of screened flooding prevents fluid carry over in the air stream. Copies of the publication may be obtained on application to the Ozonair Engineering Co. Ltd., The Esplanade, Rochester, Kent.

Tin Researches.—The report of the Tin Research Institute for 1956 deals with the new discoveries in the methods of synthesising organotin compounds, which will, it is thought, open the door to many industrial applications for this class of compound in the control of fungi in industry. "Bright" tin coatings by the electrodeposition method have long been one of the Institute's objectives; in the guarded terms of the report ". . . some results have been obtained which give promise that (bright coatings) may be achieved." The Institute has continued to disseminate information on its researches and developments, with advice and help to tin users throughout the world. The report is available free of charge on application to the Tin Research Institute, Fraser Road, Perivale, Greenford, Middlesex.

French Railways Travel Literature.—The standard of the travel publications in English issued this year by the French National Railways and obtainable from French Railways Limited, 179, Piccadilly, London, W.1, or from principal travel agents, is as high as ever. The 1957 edition of the booklet "France" contains new illustrations in colour and monochrome. The booklet "Catholic France," describing the holy places, cathedrals, and churches, has been re-issued. The coloured folders describing regions achieve the level of previous years; each folder features a group of regions such as the Loire valley and the Atlantic coast or the Auvergne and the Tarn gorges. There is also a good folding map of railway and S.N.C.F. motorcoach routes, and a folder "Choose France," which indicates not only the attractions of natural scenery, art treasures, and architecture, but also industrial installations open to the public. Another folder gives details of the main summer train services.

Power Bridge Lifting Equipment

Heavy-duty pneumatic-hydraulic long stroke jacks used extensively on the German Federal Railway

Heavy duty pneumatic-hydraulic lifting jack in position ready to raise load

THE German Federal Railway is now using improved equipment for the purpose of raising girders or other heavy objects, either singly or as part of a complete structure—necessitated, for example, to cope with subsidences occasioned by mining operations—in place of the simple hydraulic jacks operated from hand pumps hitherto employed. These could handle loads of 50-200 tons and had a stroke of about 6 in. so that when a greater one was called for more than one lifting operation had to be performed, consuming much time, always precious when work is being effected under an engineer's possession. Such a process also is wasteful of man power, an important consideration today, with high labour costs and difficulties in recruiting suitable staff. It was therefore decided to adapt to this type of work the Deutschland re-railing device, constructed by the Maschinenfabrik Deutschland of Dortmund, as illustrated in the accompanying photograph.

This operates from a compressor diesel set, the initial pneumatic power at about 120 lb. pressure being transformed by converter equipment into hydraulic effort at about 4,400 lb. pressure, and is able to function over a range of about 19 in. in a single operation. The results achieved with it have been so successful that it has been exclusively used for all bridge lifting work on the Federal system since about the middle of 1955. Work previously requiring 16 men to attend to the lifting equipment can now be done with at most five and in much less time. As much as 30-40 min. was required before to effect a lift of only 6 in. whereas now one over three times as great can be carried out in 4 min. It is often possible, by careful planning and organisation, to execute important work in a normal interval between trains without disturbing the traffic arrangements.

It is no longer necessary to draft men from other sections of the engineering staff to handle such special works, once unavoidable. The new facility has been found especially valuable since the extension of electrification has necessitated the raising of many structures to give the required additional clearance for the contact lines. Even with the comparatively short experience already obtained with the apparatus it has become clear that it is indispensable to the efficient and economic prosecution of work of this type.

Raising a Four-Track Bridge

As an example of the application of the Deutschland equipment reference may be made to the lifting of a four-track plate girder bridge of some 59 ft. span resting on brick piers, following mining subsidences. It had become no longer possible to compensate for track level deficiency by adding to the height of the ballast, which of course meant increasing the load on the girders. Opportunity was taken when raising the bridge to re-align the track, which necessitated widening the whole structure by some 14 in. The abutments were wide enough to allow of the bridge being divided longitudinally and one of the halves so obtained being displaced by the requisite amount, the gap being filled in with new platework. Traffic had to be kept running without interruption and an interval of about 3½ hr. nightly could be allowed to the work.

It was decided to raise one-half of the structure during one interval and the other on some other night, through a distance of about 17 in. and then move one half sideways, as explained.

Temporary supports for the tracks had of course to be installed, to enable ballast to be taken out and the division in the structure effected, while steel stagings were arranged at each abutment, able to take the full load while the latter were built up to the new level. Reinforcing transverse members, specially strengthened directly below each main girder, were provided below the structure, to avoid unequal stresses being set up during the lifting operation. By making this staging to accurate dimensions the full stroke of the jack pistons was obtained. Lifting was done by two 60-120 ton jacks, with two in reserve, fed through flexible hydraulic hose pipes from the power converters, taking air from compressors. Bearing castings were secured to the upper works so as to be lifted with them.

The track was previously lifted by winches, kept under load, the temporary timber track supports being taken out to give clear space underneath. The preliminaries occupied about 45 min. and the whole lifting procedure was effected in 1 hr., leaving nearly 2 hr. in which to restore the track and ballast and secure things in proper condition for traffic to be resumed. This time was found to suffice and the building up of the abutments could then follow. The second half of the structure was similarly dealt with, but moved transversely the required distance on roller cradles.

AMENITIES BUILDING AT SALTLEY M.P. DEPOT.—Work has begun on new staff premises at Saltley Motive Power Depot for the use of the 1,200 enginemen employed there. Constructed of a steel framework with brick end walls and pre-fabricated timber panels infilled with glass, it consists of single and double storey blocks with two messrooms, locker rooms, washing facilities, cloak rooms, and offices. Because of the proximity of a large coaling plant a mechanical ventilation system is being provided and precautions have been taken to prevent coal dust from getting into the building.

TYPIST LINGUIST ON SPECIAL B.I.F. TRAIN.—A typist who can speak six languages, French, German, Italian, Spanish and Portuguese, will occupy an office on the special B.I.F. through restaurant car trains between Euston and Castle Bromwich. Her services will be free to passengers. Arrangements have also been made by the London Midland Region for diesel-electric locomotive No. 10203 to haul the special train which leaves Euston at 8.55 a.m. and returns from Castle Bromwich at 5.10 p.m. each weekday from May 6 to 17 (except May 11). A special local train service between Birmingham New Street and Castle Bromwich will be maintained by diesel railcars.

Track Loading Fundamentals—7*

Various speed effect formulæ

By C. W. Clarke, M.I.C.E., M.I.Mech.E., M.I.E.Aust., M.Inst.T.

DUE to the perturbations of a vehicle at speed the rail stresses are increased. Determination of the permitted speed is based on the computed value, deduced by the elastic theory of the primary flexural stress at the base of the rail axis not exceeding the allowable stress value for the rail steel. The computed value includes an allowance for impact or speed effect. The impact factor used is the Indian Railways formula and 30,000 p.s.i. as the allowable flexural stress. In computing the live load value the impact factor is applied only to the particular static load and the hammer-blow and traction augment are added algebraically for each wheel, since they are considered to be dynamic augments to the live load. The Association of American Railroads recommends, for rails of American manufacture, that the allowable flexural stress value be limited to 35,000 p.s.i. where generally the speed is not over 35 m.p.h., provided there is little or no passenger traffic involved, and that the stress value should be limited to 30,000 p.s.i. where speeds exceed 35 m.p.h. regularly.

The impact factor recommended by the A.A.R. to provide for speed effect is

$$K = \frac{33\ V}{100\ D} \quad \ldots\ldots\ldots\ldots \quad (92)$$

and for steam locomotives unbalance in the drivers is to be added to the computed static stress before applying the impact or speed factor.

Presumably for the case of a motor-driven wheel the load transfer due to torque reaction would be treated in the same way. In the case of a quill drive the effect, except at a rail joint, might be considered as due to a fairly steady increment rather than a dynamic or pulsating load, but in the case of an axle-hung drive the slightest vertical movement of the wheel reacts on the kinetic energy of the rotating motor armature and dynamic augments could be produced. If the hammer-blow and motor torque reaction are not to be treated as dynamic augments, but as increments to the static wheel load before the impact factor is applied, then the A.A.R. formula gives slightly higher values for J_v than those computed by the Indian Railways formula. The difference is slight because the impact factor used by the Indian Railways is greater, and where there is a small hammer-blow the value of J_v computed by the A.A.R. formula can be lower.

The Talbot load for permitted speed V, according to the A.A.R. computation, would be expressed mathematically as

$$TL_v = (P + H_v + T_v)(1 + K)F \text{ lb.} \quad (93)$$

and to note the distinction compare with equation 38, remembering that the value of K is generally higher in the case of the Indian Railways formula for speed effect.

The A.A.R. also consider the shear stress in the rail below the wheel-rail contact area should be kept below 50,000 p.s.i. in all cases. Presumably this is based on static wheel load values. If the speed factor and dynamic augment are considered the shear stress value in practice could be much higher.

Speed Effect

A formula for speed effect suggested by Petersen[1] is

$$K = k_1 + k_2V + k_3V^2 \quad \ldots\ldots \quad (94)$$

where the value of $k_1 = 0{\cdot}1$ for diesel or electric locomotives on soft springs having lateral freedom of deflection, or 0·2 to 0·3 for steam locomotives with stiff springs; $k_2 = 0{\cdot}005$ to $0{\cdot}015$; $k_3 = 1/10^4$ for steam drivers, or $1/10^5$ for diesel and electric locomotives and the carrying wheels of steam locomotives.

It is explained the values of k_1 increase as track gauge decreases, and should be increased 2 per cent for the leading wheels. The values of k_2 are influenced by the maintenance of the track and appear to increase with decreasing track gauge. The values of k_3 are influenced primarily by the amount of unbalance in the drivers and by the elasticity of the track. Petersen appears to disregard transference of weight in wheel loads due to torque reactions in the case of diesel-electric locomotives, but the effect at speed would be small, and for the case of a motor-driven leading wheel the conditions when coasting with power cut-off would be the more severe. Perhaps the evils of unbalance in steam driving wheels are over-estimated and those of wheels driven by axle-hung traction motors under-estimated. The relative values for the impact factor K computed by the various formulae are shown plotted against speed in Fig. 21 for comparison.

The values computed from the Petersen formulae appear high when compared with the Indian Railways or A.A.R. formulae. As it appears the speed effect varies inversely as both the track modulus and wheel diameter, the Indian Railways and A.R.R. formulae might be combined to give a suitable factor for speed effect, which could be represented by

$$K = \frac{15V}{D\sqrt{U}} \quad \ldots\ldots\ldots\ldots \quad (95)$$

and would provide for both track modulus and wheel diameter, and at the same time agree closely with the two distinct formulae established as a result of test data collected.

It would seem from first principles that vertical forces on a rail should vary as the square of the speed and lateral forces as the speed, but this neglects vertical elasticity which absorbs some of the blow. Tests conducted confirm that speed effect, insofar as it effects flexural stress values in a rail, vary according to values between V and $V^{1.2}$ and can be taken as varying approximately as the speed.

Loading on the Roadbed

According to the Boussinesq theory, which can be found in most text books on soil mechanics[2], the vertical direct stress on horizontal planes is computed as shown in Fig. 22, and is given by

$$p_n = k\,\frac{q}{d^2} \quad \ldots\ldots\ldots\ldots \quad (96)$$

where

$$k = 3/2\,\pi[1 + (r/d)^2]^{\frac{5}{2}} \quad \ldots\ldots\ldots \quad (97)$$

$$\text{or} = 3\,d^5/2\,\pi\,R^5$$

The values for the influence factor k for the ratio r/d have been calculated and are published in the form of tables. The vertical stress under a finite loaded area can be calculated from the tables or by the use of influence charts. The vertical normal stress at depth d below the centre of a uniformly loaded circular area of radius r carrying a load q per unit area is

$$p_m = qk \quad \ldots\ldots\ldots\ldots\ldots \quad (98)$$

where

$$k = 1 - \left[\frac{1}{1 + (r/d)^2}\right]^{\frac{3}{2}} \quad \ldots\ldots \quad (99$$

As an example, consider a 30-in. dia. plate carrying a uniform load of 10 p.s.i., and it is required to know the vertical pressure at a depth of 10 in. below the centre of the plate. The ratio r/d is 1·5 and from tables the value of k is 0·829, when

$$p_m = 10 \times 0{\cdot}829 = 8{\cdot}29 \text{ p.s.i.} \quad \ldots \quad (100)$$

The vertical stress would be negligible at a distance of 25 in. from the centre of the circular plate on a horizontal plane 10 in. below the surface.

Next consider a square plate with 20-in. sides, carrying a uniform load of 10 p.s.i. The vertical stress below the centre of the plate, at depth 10 in., would be four times the stress at the inner corner of each quarter. From tables the ratio $m = n = 1$ when $k = 0{\cdot}175$, and

$$p_m = 4 \times 0{\cdot}175 \times 10 = 7{\cdot}0 \text{ p.s.i.} \quad (101)$$

The vertical stress 10 in. below each outer corner would be 2·32 p.s.i., and at a distance of 20 in. from the centre of the square plate on a horizontal plane 10 in. below the surface, the vertical stress would be negligible.

Next consider the case of a circular footing of radius r as shown in Fig. 23. The curve C_1 shows the distribution of normal stress in the horizontal

* Parts 1, 2, 3, 4, 5 and 6 appeared in our issues of January 11, January 25, February 8, February 22, March 8, and March 22, respectively.

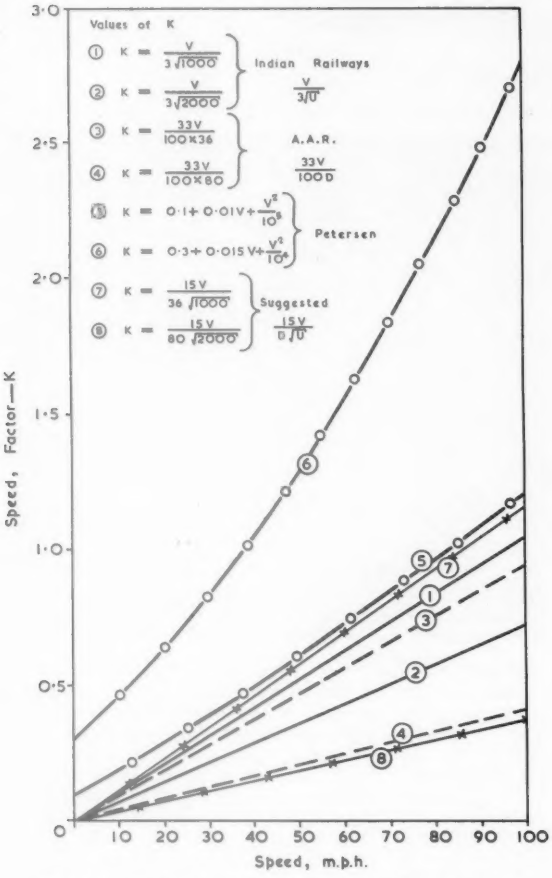


Fig. 21—Relative values of K for various formulæ

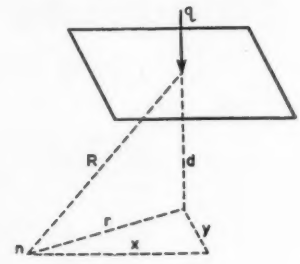


Fig. 22—Boussinesq coordinates for the determination of vertical pressures

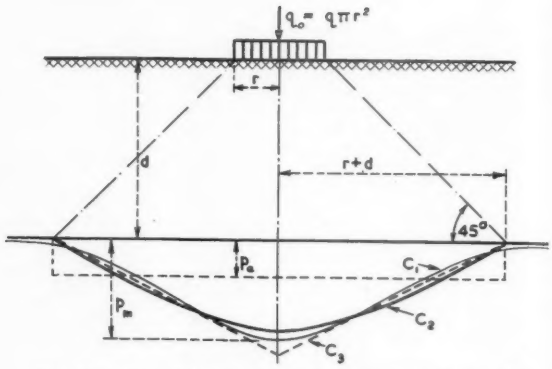


Fig. 23—Distribution of vertical pressure beneath a loaded footing

section according to Boussinesq, but this can be simplified by considering a curve C_2, in which the normal unit pressure is given by the ordinates of a paraboloid, or a curve C_3, in which the normal unit pressure is given by the ordinates of a cone, constructed as shown.

If p_m is the vertical unit pressure under the centre of the footing, the total pressure represented by the paraboloid is $p_m\pi\,(r+d)^2/2$ and this must be equal to $\pi\,r^2q$ when

$$p_m = 2q\,r^2/(r+d)^2 \quad \ldots\ldots\ldots \quad (102)$$

and this can be expressed as

$$p_m = 2q \cdot \frac{\text{area of footing}}{\text{base area of pressure pyramid}} \quad (103)$$

If the vertical unit pressure under the centre of the footing is represented by a cone, then

$$p_m = 3q \cdot \frac{\text{area of footing}}{\text{base area of pressure pyramid}} \quad (104)$$

The values of the vertical pressure beneath the centre of a circular plate of 10 in. dia. carrying a uniform load of 10 p.s.i., computed according to the Boussinesq equation and the paraboloid and cone approximations are shown plotted in Fig. 24. In practice, ballast depth is not less than half the width of a sleeper and for ballast depths ranging up to twice width of sleeper the value for the maximum vertical unit pressure would lie within the paraboloid and cone approximations. The maximum intensity of pressure on the roadbed, or at a given depth in the case of a foundation, determines the settlement, but the track engineer is not greatly concerned with settlement as the soil of the roadbed has a recovery period between the passage of trains, although in the course of time the recovery value would be impaired. This is corrected in practice by fettling of the ballast and the addition of ballast at periodic intervals to correct for loss by attrition and weathering.

The track engineer is more concerned with the average intensity of loading on the roadbed, and for the case of the cone or paraboloid in Fig. 23 this is given by

$$p_a = q \cdot \frac{\text{area of footing}}{\text{base area of pyramid}} \quad \ldots\ldots \quad (105)$$

Since for the average pressure on the base pyramid the error between the approximation and the curve according to Boussinesq's equation is now reduced, in practice no great error is made if the approximate formulae for the determination of ballast depth are used, and the average pressure on the roadbed is computed as shown in equation 75. The error would be within the limits of the knowledge the engineer could hope to obtain on the elastic properties of the soil of the roadbed. The average depth of a cone is one third the height, and of a paraboloid one-half the height, so that the

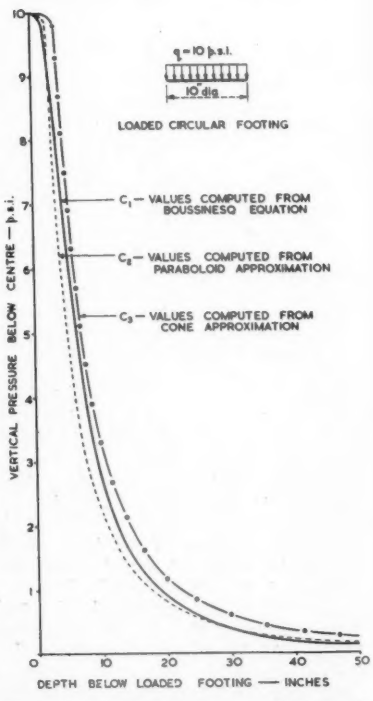


Fig. 24—Vertical pressure below the centre of a loaded circular footing

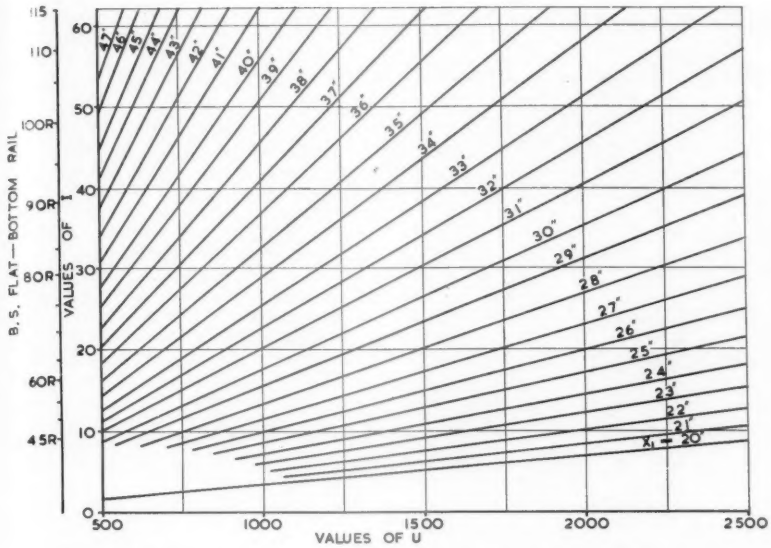


Fig. 25—Values of X_1 for various values of I and U

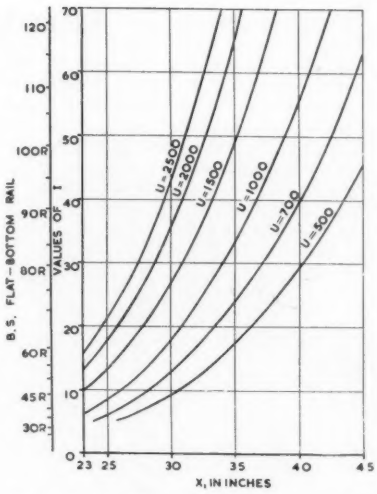


Fig. 26—Values of U for various values of X_1 and I

average pressure deduced from the paraboloid or cone approximation would be the same.

Figs. 25 and 26 are included to indicate relative values of I, U and X_1 and to facilitate calculations.

BIBLIOGRAPHY

[1] "Effect of Locomotive Weight upon Railway Bridges and Track." L. Petersen, Electro-Motive Division, General Motors Corporation, La Grange, Illinois. Report No. 8050-1, June, 1953.
[2] "Theoretical Soil Mechanics." Karl Terzaghi (Wiley, 1943).

(*Concluded*)

SUMMARY OF PRINCIPAL FORMULÆ

$$X_1 = 82 \sqrt[4]{\frac{I}{U}}$$

$$X_2 = 3X_1$$

$$K = V/3\sqrt{U}$$

$$K_0 = V^2/12{,}000$$

All wheel-load values expressed in lb.:—

$$TL_v = [P(1 + K) + H_v + T_v]\,F \text{ lb.}$$

$$ZL_v = [P(1 + K_0) + H_v + T_v]\,F_0 \text{ lb.}$$

Rail-stress index of wheelbase:—

$$C = TL_v/P$$

Roadbed loading index of wheelbase:—

$$C_0 = ZL_v/P$$

Maximum value of bending moment in rail:—

$$M_0 = 0{\cdot}318\ TL_v \cdot X_1 \text{ in.-lb.}$$

Maximum value of track depression:—

$$y_0 = 0{\cdot}39\ ZL_v/U \cdot X_1 \text{ in.}$$

Maximum flexural stress in the base of the rail-axis:—

$$f_0 = 0{\cdot}318\ TL_v \cdot X_1/Z \text{ p.s.i.}$$

Rail-seat load:—

$$q_0 = 0{\cdot}39\ ZL_v \cdot S/X_1 \text{ lb.}$$

Ballast depth required:—

$$d = 0{\cdot}0025\ \ ZL_v \cdot S/p_a \cdot X_1 \text{ in.}$$

All wheel-load values expressed in Imperial tons:—

$$TL_v = [P(1 + K) + H_v + T_v]\,F \text{ tons}$$

$$ZL_v = [P(1 + K_0) + H_v + T_v]\,F_0 \text{ tons}$$

Rail-stress index of wheelbase:—

$$C = TL_v/P$$

Roadbed loading index of wheelbase:—

$$C_0 = ZL_v/P$$

Maximum value of bending moment in rail:—

$$M_0 = 0{\cdot}318\ TL_v \cdot X_1 \text{ in.-ton}$$

Maximum value of track depression:—

$$y_0 = 880\ ZL_v/U \cdot X_1 \text{ in.}$$

Maximum value of flexural stress in the base of the rail axis:—

$$f_0 = 0{\cdot}318\ TL_v \cdot X_1/Z \text{ in.-ton}$$

Rail-seat load:—

$$q_0 = 0{\cdot}39\ ZL_v\ S/X_1 \text{ tons}$$

Ballast depth required:—

$$d = 5{\cdot}6\ \ ZL_v\ \ S/p_a \cdot X_1 \text{ in.}$$

ERRATA

Part 1

Page 45, col. 1, for "The vigorous computation of the vertical pressure," read—"The rigorous computation of the vertical pressure."

Page 48, col. 2, for "Z = Section modulus of rail, cu. in.," read—"Z = Section modulus of rail, in.[3]"

Part 2

Page 104, col. 3, for "the Talbot load as permissible speed," read—"the Talbot load at permissible speed."

Page 105, col. 3, equation 47, for "TL_v = 370W lb.," read—"TL_v = 380W lb."

Page 106, col. 3, for "from equation 51 the ratio $^4\sqrt{S/Z}$," read—"from equation 51 the ratio $^4\sqrt{S/Z}$."

Part 3

Page 159, col. 2, equation 78, for

"$$d = \frac{6{\cdot}39\ ZL_v \cdot S}{p_a\, c \cdot bL \cdot X_1} \text{ in.}$$"

read "$$d = \frac{0{\cdot}39\ ZL_v \cdot S}{p_a\, c \cdot bL \cdot X_1} \text{ in.}$$"

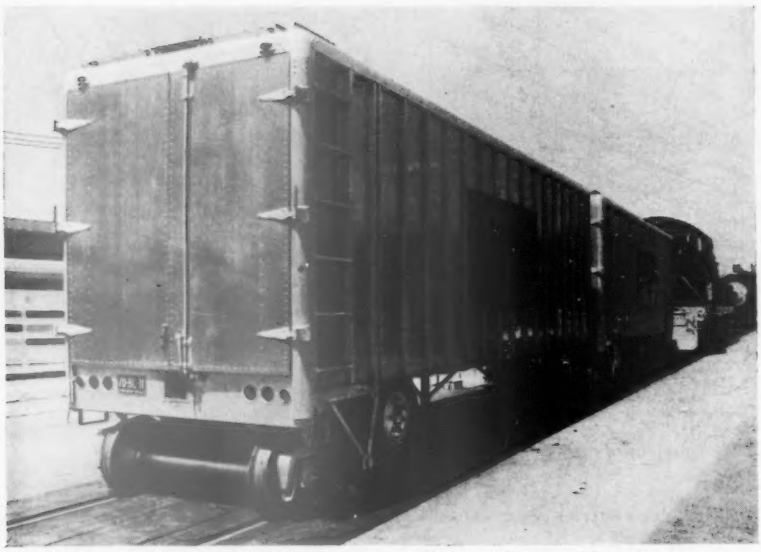
Page 163, col. 3, for "a 3-in. thick layer of coarse sand," read—"a 3-in. thick layer of coarse sand or preferably coarse gravel."

LIMITING DIMENSIONS OF AIR FILTERS, B.S. 2806:1956.—The limiting dimensions specified in this British Standard apply to air filters which comply with Grades A-B of the companion standard B.S. 1701 "Filters for Air Supply to Internal Combustion Engines and Compressors (other than those used for aircraft)." The standard deals with filters whose air flows are within the range of from 10 to 1,000 cu. ft./min. (This range is based upon non-pulsating air flows. When selecting filters for particular applications, due allowance should be made for pulsations.) The standard specifies the screw threads to be used. The method of marking is also laid down. The object of the standard is to ensure a measure of interchangeability so that, in the event of the required make and type of filter not being available for replacement, an alternative filter can be fitted and used, even if only as a temporary measure. Copies of this standard may be obtained from the Sales Branch, British Standards Institution, 2, Park Street, London, W.1. Price 3s. 6d.

RUBBER TECHNICAL LABORATORY.—Durham Raw Materials Limited, of 1/4, Great Tower Street, London, E.C.3, distributors in the U.K. of du Pont Neoprene and Hypalon synthetic rubbers, has opened a new technical service laboratory at Camberley, which will supplement the work done by the company's technical centre at Birtley, Co. Durham; the laboratory facilities will be freely available to firms wishing to assess the many advantages of the du Pont group of products.

Combined Rail-and-Road Wagon

Research on the Chesapeake & Ohio Railway



Two prototype rail-road vans of Chesapeake & Ohio Railway, showing position of road wheel

WITH the object of recapturing traffic lost to the railways, there has been an expansion of flat car-trailer operating on certain of the U.S. railways. The majority of railways using the system are contracting with road operators, often subsidiary organisations, to do terminal area transportation. While the Chesapeake & Ohio Railway have not yet entered this field of operating, the company are giving considerable study to the various aspects involved. It is considered that basic requirements include the provision of fast scheduled lightweight articulated through trains which should avoid classification yards, equipment at reasonable cost, reduction in loading and unloading time, and riding characteristics up to 85 m.p.h. without damage to contents.

With these objects in view the railway has developed the Railvan, the dimensions of which are as follows:—

Length overall	29 ft. 3½ in.
Body length, outside	26 ft. 4½ in.
,, ,, inside	26 ft. 1½ in.
Kingpin to rear	25 ft. 4½ in.
Width, outside	8 ft.
Width, inside	91 ft. 0⅜ in.
Volume	1,500 cu. ft.
Rail clearance	11 ft. 7 in.
Road clearance, rear	12 ft. 3 in.
Floor height, road	4 ft. 3 in.
Floor height, rail	3 ft. 7 in.
Coupler height, rail	3 ft. 1⅛ in.
Landing gear, height above rail	7 in.
Tare weight	10,500 lb.
Load capacity	27,500 lb.
Permissible tyre load	22,000 lb.

A remarkable feature of design is the combination of road wheels and railway axle on a single suspension system; the major part of design and development work has been a connection with the running gear, and associated structure.

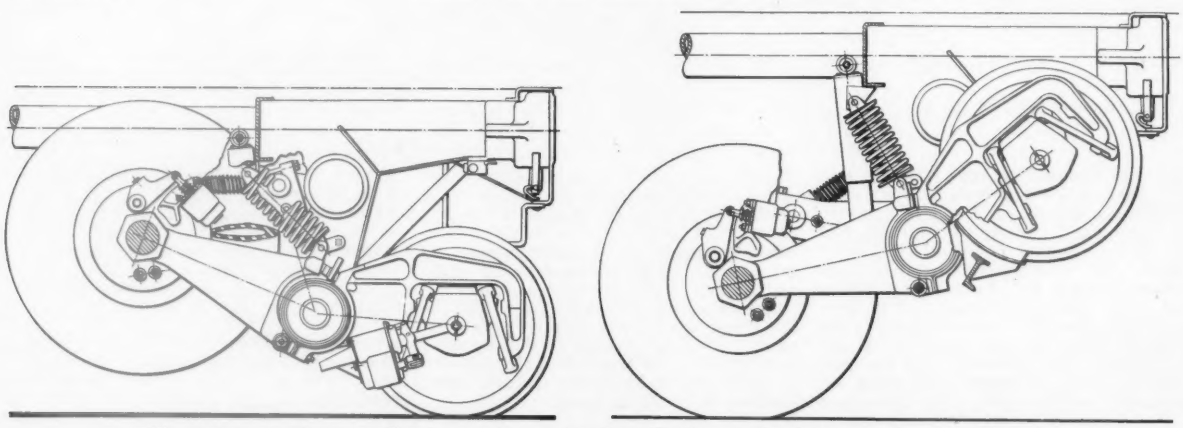
Springing is accomplished by the use of two Goodrich B.F. type torsilastic springs mounted cross wise, one on each side of a central support housing. These springs consist of an inner steel tube, an intermediate rubber tube, and an outer steel shell with rubber vulcanised to both steel members. The rubber deflecting in shear acts as a torsional spring element. Arms supporting the rail and road wheels are attached to the outer steel shells of the springs; the inner tubes are torsionally positioned on a centrally located splined shaft which is anchored by a fork arm.

An air, motor driven ball screw actuator, connects the fork arm to the frame, its 18 in. travel moves the splined shaft and spring tubes about 60 deg. rotation. By holding the inner tube stationary in relation to the body, the rail and road wheels are elastically supported in respect to the body. By revolving the inner tube, either the rail or road wheels may be brought to its running position: the actuator is the prime-mover that transfers the Railvan from rail to road position. The rail-road arm lengths are proportioned as to provide approximately equal static deflection and actuator loadings in either rail or road position.

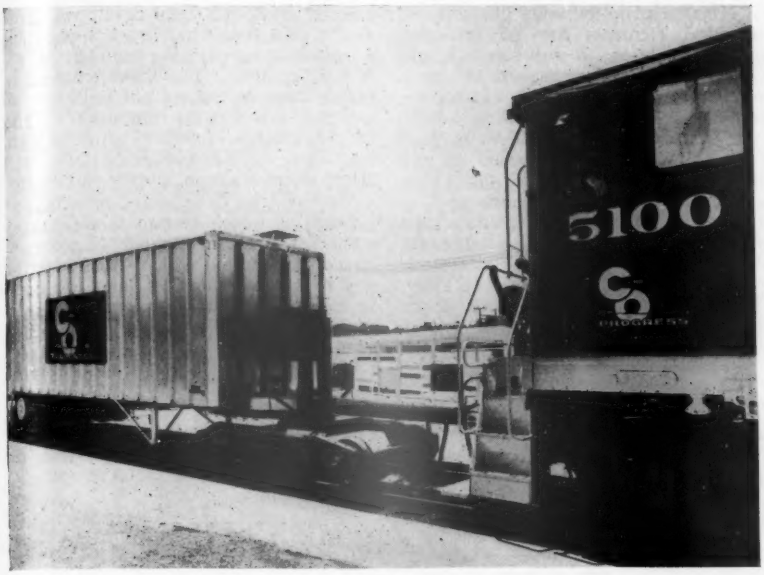
It is not expected that the rubber will take a torsional set even after protracted service, should this occur, however, floor height correction can still be made because of the over-travel provided in the ball screw actuator. The riding of the vehicle is accomplished by two long-travel, direct-acting shock absorbers of the motor car type, mounted between brackets on each spring, and brackets on the body.

Actuator Assembly

The actuator is very compact, specially considering the 60,000 lb. bi-directional force it is capable of exerting. A reversible 6 h.p. vane-type air motor with an integral 5,500 r.p.m. limiting throttle governor is mounted



Changeover equipment, showing spring-assisted mechanism and relative road-rail positions



Railvan with adapter car for haulage by diesel locomotive

at right angles to the actuator screw in such a manner that the motor axis coincides with that of the upper trunnion. A two-way clutch, installed between the motor and driving pinion, acts to hold the selected running gear position, and absorb the energy on descent by acting as a brake. In addition to the face gear and driving pinion, two stages of planetary gearing give an overall reduction ratio of 51, 45·1 to the 2½ in. dia. three-pitch screw.

Two ring assemblies of adequate capacity to absorb full screw torque limit the ball nut travel by stalling the drive motor. Normally, they do not come into action, as the actuator has over-travel beyond the designed running gear position. The centre of the rail wheels is located 1 ft. 7 in. to the rear of the centre of the torsilastic spring. The wheels are 2 ft. dia. and axles are fitted with taper roller bearings. The axleboxes have two brackets to which are attached by means of ball socket joints the spring hangers, these being attached by similar means to the cast-steel rail arms, the pedestal opening in the arm permits a total fore and aft movement of one in. and a lateral freedom of 3 in. movement is restricted to the above limits by lugs on the axlebox.

Road Wheels

The road wheels are mounted on cast-steel arms 2 ft. 1 in. forward of the centre of the torsilastic springs to which the arms are attached by hinge connection so arranged that when the running gear is in the rail position road wheels contact the underside of the vehicle, opening the hinge and consequently divorcing the road running gear from the angular motion of the torsilastic spring. A steel helical compression spring holds each road arm against the van floor. Besides providing a rail clearance, the hinged joints also isolate the road running gear from any effect from the rail joints. Each road wheel is equipped with an individual brake drum. With the exception of the axle and brake spiders, the road running gear is constructed of normal road vehicle components.

The fact that the Railvans will not be subject to normal shunting as in classification yards permits the installation of an elementary type of automatic brake control, which is incorporated as part of the brake beam assembly. Braking force is caused by coil springs, so proportioned as to give an empty load emergency braking ratio of 40 per cent on the two composition brake shoes. The brake beam is carried on rubber bushing hangers inboard of the rail wheels. Design is such that only a small brakeblock travel is necessary. Mechanical ratchet and screw type automatic slack adjusters are fitted. Special landing gear has been designed consisting of counter-balanced drop legs, during trials approximately five sec. are required to lower the landing gear to the rail position, and less to transfer to the road position.

Buffing Load

The centre sill consists of a single seamless-steel tube 5½ in. dia. with a 0·361 wall thickness with a minimum yield of 80,000 p.s.i., internally upset and taper-threaded, it is threaded in to the rear coupler which is its only attachment point to the Railvan. It passes through the cross-members and front bolster, and these are separated by plastic bushes. Under 400,000 lb. buffing conditions, the centre sill deflects axially about 0·8 in., but because of the design, this deflection is not transferred to the Railvan itself.

The coupler, of plug and socket type capable of supporting vertical and drawing load, has its plug portion screwed into the centre sill at the front by a ball joint with 10 deg. angular freedom. The socket portion is welded into the rear bolster. The coupler is completely automatic, engaging on impact, and at the time of coupling, also connects the train brakepipe, which passes through its centre. The coupler and centre sill system has been designed to withstand a buffing and draft load of 400,000 and 250,000 lb. respectively, without exceeding yield strength of the materials.

The floor consists of 15 extruded aluminium sections 6 in. wide, running the length of the van, the outer webs

Checking of compressed air motor which operates the dual wheel sets

being jig drilled through the centre lines of the integral tongues and grooves, and fastened together by means of bolts and aluminium die castings; the centre line of the die castings coincide with the steel cross-members, thus, the die castings serve as positioners to locate the major underframe components. This method of assembling the floor gives the Railvan considerably more cornering strength than would be available using a normal floor assembly. This also has the additional advantage that there are no extrusions, such as bolt heads, to damage fork truck tyres or the goods in transit. The gap between the floor and side sheets are sealed by means of a Koroseal extrusion.

Cross-members are basically of channel section and are located at 18 in. centres; intermediate cross-members have lightening holes. The ends are tapered and have pads welded to them for attachment to the body uprights. All structural elements are of low-alloy high-tensile steel, to combine strength with lightness and resistance to corrosion. The body is of all aluminium, semi-monocoque construction. To meet I.C.C. regulations roof walls, grab irons, and ladders are provided, as well as standard roof clearance, tail lights, and so on. Aluminium beams of 3-in. section serve as uprights. Side sheets of 0·018 in. thick, 6061-T6 aluminium, while the side post and other extrusions are of either 6061-T6, or 6063-T6 alloy. The roof sheet is 0·050 in. thick, about 0·030 lb. heavier than used by the trailer industry.

Suspension

The single axle suspension used on the Railvan necessitates a vertical support for the forward coupler of the first unit when coupled to a train, and an adapter truck has been developed, consisting of a four-wheel truck supporting a socket type A.A.R. Railvan to an A.A.R. coupler. The superstructure is pivoted on the centre pin hole of the truck, and is free to rotate 360°. The adapter truck is counterweighted so that the mass centre coincides with the centre of the Railvan coupler ball centre.

Various tests have been conducted, as a result of which certain modifications are being carried out, including a new underframe design which will substantially reduce weight, cost, and the concentration of stress at connections to the side frames. These, and other modifications are being carried out on a further vehicle, which after tests will probably become a prototype for the production of up to 150 units. Extensive tests will, however, be carried out by the railway to obtain some idea of the economic value of the development.

Civil Engineering Department Training Centre at Kings Cross

Initial instruction for youths in basic principles of drawing office and field work

THE Chief Civil Engineer of the Eastern Region of British Railways, Mr. A. K. Terris, has inaugurated a Training Section at Kings Cross, in which suitable young men can receive initial instruction in the basic principles of drawing office and field work. The training is in the hands of an experienced technical assistant and facilities exist for 20 boys to be accommodated at one time. The training syllabus is normally of six months duration and, apart from railway civil engineering, it also embodies suitable tuition in the general conduct of the railways as a business and the functions of the various departments.

At the completion of the training course the students are drafted to positions within the department or are transferred to the Student Civil Engineers' Scheme, depending on the progress each individual has made.

Concurrently with these training arrangements, the students are encouraged to study at day and evening classes with a view to obtaining professional qualifications.

Need for Qualified Engineering Staff

The magnitude of the railway modernisation plan necessitates a considerable expansion of professional and technical staff in the Civil Engineering Department and a steady influx of promising young engineers into the service during the coming years.

Experience has shown that there was a growing need for suitable measures to be taken to attract the right type of young man and to afford appropriate training facilities, with the object of: (*a*) relieving the senior members of the staff from the task of training; and (*b*) enabling the new entrants to become useful members of the department in the shortest possible time.

The young men are recruited through contacts with the different kinds of schools and with youth employment officers and, in general, are about the age of 16 or 17 on entry.

The minimum standard of education required is a pass at Ordinary Level in the General Certificate of Education in English, mathematics, and two science subjects, or in one science subject and a foreign language; in other words, a certificate which will gain exemption from the Common Preliminary Examination of the Institution of Civil Engineers.

Individual instruction during a class

C.A.V. EXHIBITS AT THE B.I.F.—At the stand of C.A.V. Limited in the electrical section of the British Industries Fair at Birmingham on May 6-17, exhibits include a comprehensive selection of both fuel injection equipment and electrical equipment for industrial, agricultural, transport and marine engines. Included in the fuel injection equipment are sectioned models of C.A.V. injection pumps with flyweight, hydraulic and pneumatic governors, and typical injection nozzles cut away to show the details of construction. Other equipment which will be shown includes a paper element fuel oil filter, the Thermostart starting aid for small diesel engines, and electrical generators and engine starters.

RAILWAY NEWS SECTION

PERSONAL

Mr. C. C. Inglis, Chief Research Officer, British Transport Commission, has been appointed a member of the British Coal Utilisation Research Association.

Mr. Mohammed El Fadl, Chief Engineer, Sudan Railways, who, as recorded in our March 29 issue, has been appointed General Manager of that system, was born in 1903 and educated at the Gordon Memorial College, Khartoum. He graduated from the School of Engineering in 1923 and joined Sudan Railways as Assistant Surveyor. For over four years Mr. El Fadl was subsequently employed in the Abu Hamed District and took part in re-sleepering the line deviation and in the construction of civilian staff quarters. During 1927-28 he was connected with the Kassala-Gedaref construction and remained in Kassala District until 1934. In 1931 he had been the first Sudanese to be entrusted with the position of Assistant Superintendent of Way & Works for the Kassala-Gedaref Section. He was next appointed District Surveyor, with which position he combined that of Technical Assistant to the District Engineer, Atbara and Gebeit districts. During the war he was engaged on work necessitated by troop movements. This included station-lengthening and construction of army depots and of the Jebelein and Tessenei railway extensions. After becoming District Engineer Mr. El Fadl was employed on the construction of underground reinforced concrete oil reservoirs, and was later posted to the Gebeit and Wad Medani districts, where he served until 1948, when he was transferred to Headquarters as Assistant Maintenance Engineer. In 1951 he was promoted to be Senior District Engineer. He was deputed for survey work of the Sennar-Er Roseires extension and was responsible for the construction up to Singa at the time he was sent to the United Kingdom on a special course during 1953. On his return he continued as Senior District Engineer until his appointment as Chief Engineer of the system in 1955.

Mr. Mohammed El Fadl
Appointed General Manager, Sudan Railways

Mr. A. Masoud
Appointed Deputy General Manager, Sudan Railways

Mr. Peter B. Gorst, Export Manager of Ransomes & Rapier Limited, leaves England by air on May 2 on a two-month sales promotion tour of the Sudan, South Africa, Portuguese East Africa, the Rhodesias, the Belgian Congo, Uganda and Kenya.

Mr. Nelson Adeyemi Kuforiji has been appointed Assistant General Manager (Staff), Nigerian Railway. The appointment dates retrospectively from October 24, 1956, since which date Mr. Kuforiji has been acting in that capacity. Mr. Kuforiji joined the system in 1926 as a Traffic Learner, was promoted to the third class station staff in the same year, as a second class clerk in 1928, first class clerk in 1940, and as Assistant Chief Clerk in 1942. He entered the Senior Service in 1948 as Assistant Establishment Officer, and was promoted to be Establishment Officer in 1951. He became Senior Labour Relations Officer in 1953, and, when the Corporation established an office in London at the beginning of last year, Mr. Kuforiji was sent there as Assistant Representative.

Mr. Abdalla Masoud, O.B.E., Traffic Manager, Sudan Railways, who, as recorded in our March 29 issue, has been appointed Deputy General Manager of that system, began his railway career as a traffic probationer in 1923. On completion of his special training Mr. Masoud became Traffic Inspector in 1929. He was promoted to be District Traffic Manager in 1946, and, in 1948, was seconded to the Legislative Assembly as Under-Secretary for the Sudan Railways, a position he held until 1953. He was appointed Divisional Traffic Superintendent, Southern Division, in 1950, and, in 1955, Traffic Manager. Mr. Masoud represented Sudan Railways at the Coronation of H.M. King George VI in 1937, and was awarded the O.B.E. in 1952.

The British Transport Commission announces that Mr. B. D. L. Lincoln, Divisional Police Superintendent (Manchester Division), Midland Area, has been appointed Assistant Chief of Police, Scottish Area (located at Glasgow). Mr. Lincoln spent his early life in India where his father was an officer in the Indian Police. He was educated at Lawrence College and at the

The late Mr. S. L. Murgatroyd
Permanent Way Engineer, Southern Area, L.N.E.R., 1923-29

Mr. A. W. Newberry
Appointed Chief of Police, Scottish Area, B.T.C.

Mr. H. H. Mason
Appointed District Motive Power Superintendent, Carnforth, L.M. Region

University of the Punjab where he took a degree in history and economics and afterwards joined the Punjab Police. He became District Deputy Superintendent of Punjab Police in 1934 and, in 1939, was posted to the newly-formed Crown Police Battalion, Neemuch, Central India. In 1941 he was appointed District Superintendent, and was in armed action against the dacoits, being awarded the Indian Police Medal in 1942. He returned to England in 1948 and was appointed Superintendent of British Railways Police, Manchester.

The late Mr. Samuel Lees Murgatroyd, O.B.E., M.I.C.E., whose death on March 21 in his 94th year was recorded in our last week's issue, was Permanent Way Engineer of the Great Central Railway and, after amalgamation, of the London & North Eastern Railway (Southern Section) from 1917 until his retirement in 1929. Mr. Murgatroyd began his career as an apprentice in the Locomotive and Carriage & Wagon Shops of the Manchester, Sheffield & Lincolnshire Railway, later transferring to the Civil Engineering side. After serving in the office of the District Engineer, Sheffield, and the Head Office of the company he became District Engineer, Lincolnshire, and while so engaged his services were used in the layout of the permanent way of the London Extension Line. In 1902 he was appointed Assistant Engineer to the Great Central Railway, and, in 1917, became the Permanent Way Engineer of that company, continuing to serve in the same capacity with the London & North Eastern Railway after amalgamation and until his retirement on January 31, 1929. Mr. Murgatroyd took keen interest in matters affecting staff welfare; he was appointed a Committeeman on the Great Central Pension Fund, also on the Edward Ross Memorial Fund Committee. He took an active part in the early life of the Permanant Way Institution, of which he was President in 1896. For a number of years he commanded a company of railwaymen in the 4th Manchester Volunteer Regiment, and when the National Reserve was started, he formed and commanded a company of similar consist. He was made an Officer of the Order of the British Empire in 1925. After his retirement he lived in Northwood, Middlesex, and served for several years on the Ruislip & Northwood Urban District Council. He later moved to Buxton, and, since 1953, lived at Eastbourne. Mr. Murgatroyd was a member of the Institute of Transport from which body he resigned some years after his retirement. He continued, however, to take an active interest in the Permanent Way Institution, which he had joined in 1885, one year after it was formed.

Mr. S. T. Stanbridge
Appointed Stationmaster, Charing Cross, Southern Region, British Railways

Mr. J. Rostron
Appointed Assistant Sales Manager, Traction Department, M.-V. Electrical Co. Ltd.

Mr. J. Dummelow
Appointed Assistant Manager, Publicity Department, M.-V. Electrical Co. Ltd.

Mr. A. W. Newberry, who, as recorded in our April 12 issue, has been appointed Chief of Police, Scottish Area, British Transport Commission, served in the Royal Navy during the 1914-18 war, after which he joined the Isle of Wight Police Force. He transferred to the Southern Railway Police in 1926 and, after service in the London, Plymouth, Brighton and Portsmouth districts, became Inspector in the London Division in 1948. Appointments followed as Chief Inspector in the Birmingham and Paddington Divisions and as Superintendent in the Edinburgh and Waterloo (London) Divisions, and, on September, 10, 1956, he was appointed Assistant Chief of Police, Scottish Area, the position he now vacates.

Mr. H. H. Mason, who, as recorded in our April 19 issue, has been appointed District Motive Power Superintendent, Carnforth, London Midland Region, British Railways, began his railway career in 1917 at the age of 14 as an apprentice fitter on the Midland Railway at Burton-on-Trent. He became Running Shift Foreman at Stockingford in 1929, and occupied similar positions at Buxton in 1932, at Royston in 1934 and at Toton in 1939. Mr. Mason was called up with the Supplementary Reserve (of which he had been a member since 1925) in September, 1939, serving in the Royal Engineers Railway Workshops Companies 155 and 199. He served in France and the Middle East, attaining the rank of Warrant Officer (1). In 1942 (during his period in the Middle East) he was seconded to the Palestine Railway at Lydda for six months during which time a number of new American locomotives were taken over for military services. He was awarded the M.B.E. (Military Division) in 1945. After the war he returned to Toton until 1946 when he was promoted to be Assistant District Motive Power Superintendent at Inverness. In 1947 he occupied a similar post at Crewe North where he remained until February, 1957, when he left to take over his present position. Mr. Mason is an Associate Member of the Institute of Locomotive Engineers.

Mr. S. T. Stanbridge, who, as recorded in our April 5 issue, has been appointed Stationmaster at Charing Cross, Southern Region, British Railways, began his railway career with the former South Eastern & Chatham Railway as a clerk in January, 1913. In 1915 he entered the office of the Eastern District Superintendent at Ashford (Kent), and, in 1924, joined the staff of the Eastern District Operating Superintendent (Southern Railway) at Dover. In 1923 Mr. Stanbridge was awarded the Silver "Brunel" Medal, following three years external study in the Railway Department of the London School of Economics. In 1930 he was transferred to the office of London East Divisional Superintendent, London Bridge. He was appointed Stationmaster at Westgate-on-Sea in 1933; at Lymington Town & Pier in 1938; and at Fareham in 1942. During 1944 and 1945 Mr. Stanbridge served in an acting capacity as Assistant to the Southern District Superintendent at Southampton, in which capacity he dealt with the "D-Day" traffic. He later became stationmaster at Canterbury (East, West & South); Tonbridge; and Salisbury. He was appointed to his present position at Charing Cross on October 29, 1956.

Mr. J. Rostron, M.I.Loco.E., who, as recorded in our April 19 issue, has been appointed Assistant Sales Manager of the Traction Department of the Metropolitan-Vickers Electrical Co. Ltd., took up his new position as from April 1. Mr. Rostron was educated at Bury Grammar School and Manchester College of Technology. He served his apprenticeship with the London Midland & Scottish Railway, joining the Electric Traction Department at Bury in 1931 and later transferring to Carlisle in connection with diesel-electric traction work; in 1940 he moved to Derby, becoming a technical assistant in the Chief Mechanical Engineer's office. Mr. Rostron came to Metropolitan-Vickers in 1946 and joined the Traction Sales Department, where he has been connected with many important electric and diesel-electric contracts for home and overseas railways.

Mr. J. Dummelow, M.A., A.M.I.E.E., who, as recorded in our April 19 issue, has been appointed Assistant Manager, Publicity Department of the Metropolitan-Vickers Electrical Co. Ltd., received his education at Marlborough and Clare College, Cambridge. After a college apprenticeship followed by technical publicity work at Metropolitan-Vickers he joined the Publicity organisation of the General Electric Co. Ltd. in 1929. During the war he served with the Royal Engineers. He rejoined Metropolitan-Vickers in 1946 and became Editor of the "M-V Gazette" and Press Officer. Mr. Dummelow is a Member of the British Association of Industrial Editors. He is also a Freeman of the City of London, being Renter Warden of the Wax Chandlers Company.

The Eastern Region announces the appointments of Mr. E. A. Rogers, A.M.I.E.E., M.I.R.S.E., as Assistant Signal Engineer (Modernisation), and Mr. P. A. Langley, A.M.I.E.E., M.I.R.S.E., as Assistant Signal Engineer (General), Signal Engineer's Department, Kings Cross.

These appointments have been made as a result of reorganisation in the Signal Engineer's Department, Eastern Region, in view of the many signal engineering developments under the Modernisation and Re-equipment Plan for British Railways.

Mr. Rogers' appointment is effective from September, 1956, and Mr. Langley's from February, 1957.

Mr. H. R. Chubb has been appointed Regional Welfare Officer, Western Region, British Railways.

The Management Committee of the International Union of Public Transport (U.I.T.P.) met in London on April 11 & 12. The following members attended:—

President: Monsieur Charles Harmel (Liège); *Vice-Presidents:* Dr. F. Lademann (Hamburg) and Mr. W. Vane Morland (London); *Members:* Messrs. John Cliff (London), L. Devillers (Paris), B. England (Nottingham), B. Grohs (Vienna), R. Hoens (S.N.C.V., Brussels), W. Kesselring (St. Gallen), P. Lalou (Brussels), C. F. Mathiesen (Oslo), E. Nielsen (Copenhagen), H. Perdreau (Lyons), J. Peridier (Toulouse), H. von Heland (Stockholm), Dr. A. Fogliano (Turin), Dr. K. Kruger (Cologne), Dr. W. Schneider (Berlin); *Gen. Secretary:* Monsieur L. de Leidekerke. *Secretary:* Monsieur A. J. Jacobs.

While in London they were the guests of the London Transport Executive, and, on April 12, were shown over the new bus overhaul factory at Aldenham.

Consequent on the retirement of Mr. C. T. Goodchild, Works Superintendent (Aldenham), London Transport Executive, the following change in organisation is announced. Mr. A. F. Tame, A.M.I.P.E., has been appointed an Officer of the Executive with the title of Works Superintendent (Aldenham). He will report to the Works Manager (Buses & Coaches) and will be responsible for the general control of Aldenham Overhaul Works. Mr. Tame, who is 44, was employed by London Transport from 1935 to 1945; from 1941 to 1945 he served with London Aircraft Production, from 1941 to 1943 as Assistant Works Superintendent at Leavesden Aerodrome, and from 1943 to 1945 as Assistant Works Manager at the Aldenham factory. He subsequently left to take up an appointment as Works Manager with Cunliffe Owen Aircraft Limited. In 1947 Mr. Tame rejoined London Transport as Section Engineer at Chiswick Works. He was promoted to be Assistant Plant Engineer in 1951 and in 1955, became Assistant Works Superintendent at Aldenham. In 1951 he was a member of a British productivity team which visited the U.S.A. to study training for supervisory duties in workshops, including methods of selection.

As from May 1, 1957, the duties of Honorary Publications Officer in the Railway Correspondence & Travel Society are being assumed by Mr. T. J. Edgington, 57, Heathfield Road, Kings Heath, Birmingham 14, to whom all future correspondence concerning the Society's publications should be addressed.

Dr. J. N. Aldington and Sir Nicholas Cayzer, Bart., have been elected directors of Associated Electrical Industries Limited.

Mr. L. H. E. Jones, Overseas Technical Representative of Expandite Limited, will leave this country on May 5 for an extensive tour of the Near and Far East.

Mr. J. P. Jamieson has been appointed Sales Manager for the Industrial and Automotive range of portable electric tools manufactured by Black & Decker Limited.

Mr. W. R. Black has been appointed Managing Director of the A.C.V. Group. He will in consequence resign his position as Chairman of A.C.V. Sales and will give up his position as Managing Director of Park Royal Vehicles Limited, while remaining a director.

Mr. H. B. Mackenzie has been appointed Sales Manager, Replacement, and Mr. W. L. Ashton has been appointed Sales Manager, Equipment, of the India Tyre & Rubber Co. Ltd. Mr. H. Torlay, Chief Engineer at the company's works at Inchinnan for the past six years, becomes Works Manager.

Mr. G. A. Young is retiring from executive management and will therefore cease to be the Assistant Managing Director of Richard Thomas & Baldwins Limited, but will remain a member of the board. From June 1 Mr. W. F. Gilbertson will be Executive Assistant to the Managing Director. Mr. Cedric T. Thomas will become General Manager of the company's Ebbw Vale section. Mr. Campbell Adamson will become General Manager of the company's Redbourn section.

Mr. S. M. Perkins, Special Director & Manager of the Factored Machine Division of Wickman Limited, has been appointed to the board of the company. Mr. J. M. Buchanan, who has served the company in a consultative capacity since relinquishing executive office in 1955, is retiring. He first joined the company in 1930 as London Area Manager, and was appointed to the board in 1940.

NEW EQUIPMENT AND PROCESSES

Two-Speed Portable Electric Drill

A GENERAL duty, ½-in capacity, two-speed portable electric drill has been introduced. Of application to general work in rolling stock repairs, and so on, the drill enables users to perform ½-in. (high-speed), and ½-in (low speed) drilling operations in metal at the correct cutting speeds and with little effort.

An advantage of this machine is that when drilling deep ½-in. dia. holes in hard materials, extremely high penetration speeds can be obtained by drilling a ¼-in. dia. pilot hole before boring out to the required diameter. With hardwood, higher drilling capacities, 1-in. dia. on the low, and ⅝-in. dia. on the high speed, are obtained.

The switch handle is fitted with specially moulded insulation, to conform to international requirements. The gearbox assembly includes a selector mechanism and constant mesh transmission is incorporated, speed selection being obtained by the engagement of clutches integral with the final spindle gear wheels. These are operated when the machine has stopped by a plunger located on the outside of the gearbox, a push-pull movement giving the required speed.

The machine is available, fitted with a ½-in. capacity drill chuck or alternatively, a No. 1 Morse Taper socket, and designated TS24c or TS24 respectively.

The running light spindle speed of the machine is, low speed, 660 r.p.m.; high speed, 1,700 r.p.m. The spindle speed on full load is low speed, 450 r.p.m. and high speed, 1,200 r.p.m. Power consumption on full load is 440 W. Overall length of the TS24c is 15⅝ in., the TS24 being 16⅜ in. The net weight for both units is 11¼ lb. and 11½ lb. respectively. Universal motors for both d.c. and single phase a.c. 25-60 cycles can be supplied for 100-110, 110-130, 150-160, 200-220, and 220-250 V. and also for 32 and 50 V. to special order.

Each machine is supplied complete with a starting switch, a tubular side handle, 10 ft. of three-core T.R.S. cable, one spare pair of carbon brushes and a capsule of oil.

Accessories will include a chuck and arbor for fitting to drill, a drill stand and machine vice. A full range of wood drilling bits up to the maximum capacity of the machines is also available together with a range of hole cutters.

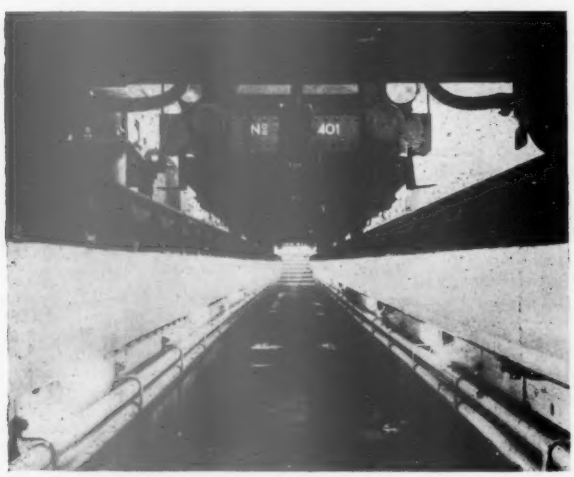
The price of the TS24 is £20 15s. and the TS24c is £22 15s.; delivery is from stock. The manufacturer is Wolf Electric Tools Limited, Pioneer Works, Hanger Lane, London, W.5.

Resin Base Protective Coatings

AS a result of experiment with new techniques and materials to improve protective coatings against attack by the weather a range of epoxy based resins has been developed with the trade name of Epikote. Trials are taking place in Belgium and France on the use of paints based on epoxy resins in the interiors of railcars; another application is in the lining of rail tank wagons, for conveying petrol, and so on.

The method of applying an Epikote resin based lining for the interior of rail tanks is comparatively simple. The surfaces to be coated are prepared by shot-blasting or some similar method, and then three, or preferably four, coats of an adduct cured Epikote resin composition are normally applied. It is usual for each coat to be 0·0015 to 0·002 in. thick. Each coat is forcefried for 1 hr. at a temperature of about 140-150° F. The third, or final, coat is usually cured for about 3 hr. at the same temperature; if it is not possible to cure the coating at these temperatures, then all coats are left to cure for about a week at an ambient temperature of 70° F.

The results obtained from the use of Epikote resin based tank linings have, it



is stated, been extremely successful. Not only can highly corrosive contents be transported without damage to the surface of the tank, but they are easier to clean when changing over from one product to another without danger of contamination. The right-hand illustration (on the previous page) shows the interior of a Teepol tank wagon which has been treated with an Epikote resin.

Other applications of Epikote formulations have included the exterior of a tank wagon for sulphuric acid, while American railway companies have used the varying thicknesses of Epikote resin based paints for lining wagons carrying 75 per cent caustic soda, propylene glycol, or carbon tetrachloride, and stoved coatings to transport natural and synthetic latex emulsions.

The suitability of resin coatings for use on concrete surfaces has led to their use on concrete inspection pits of the Netherlands Railways (left-hand illustration).

Full details of the products, including price and delivery, may be obtained from the manufacturer, the Shell Chemical Co. Ltd., Norman House, 105/109, Strand, London, W.C.2.

Containers for Conveyance of Powders and Liquids

THE Tote system, which has been used in the U.S.A. for some time, has recently been applied successfully in this country by the Western Region of British Railways for conveying carbon black.

This system provides a convenient means of bulk material handling and storage of handling powders and granulated substances, such as flour, sugar, or fine chemicals, and liquids such as oils or paint.

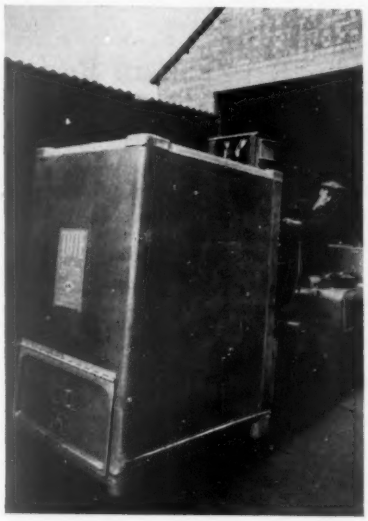
The basis of the system is the Tote bin, a container constructed in high strength aluminium alloy, which can be handled by hand or power operated stillage or pallet truck, overhead crane or fork lift truck. The bin is made in three standard sizes, of 42, 74, and 110 cub. ft. capacity. Each size of bin has a standard 9-in. dia. filling aperture and a discharge door 34 in. × 14¾ in. Both openings are fitted with gaskets and fasteners to ensure dust free and weathertight sealing.

Other features of the system are the Spinner Head Unit and Jolter, designed to ensure full capacity loading, where required, of fine powders during filling operations, and the Tilt Discharger which tilts the loaded bin to the required angle for discharging into any production or processing equipment.

Advantages are stated to include a reduction in labour and handling costs, the fact that the bins can be filled by standard equipment at present used for filling sacks, barrels or boxes, a saving of storage space of up to 25 per cent, and prevention of deterioration or contamination of contents from outside elements due to the airtight nature of the bins.

Transport of the Tote bins only requires their loading on any flat-bed vehicle available; several different qualities or blends can be delivered by the same vehicle.

In the case of the Western Region transit of carbon black, after being filled from an overhead hopper, the bins are positioned in the van by means of a power pallet truck and expanding pallet shields, used by the Region, utilised to overcome the possibility of movement during transit. At the receiving end a pallet truck positions the bins, in turn, in the doorway of the rail vehicle for offloading and conveyance to their destination by fork lift truck. Originally, standard covered vans, loaded with seven 74-cu. ft. capacity bins, have been used, giving a total weight of 5½ tons, but it is likely that open wagons carrying eight bins with an approximate weight of eight tons are likely to become the most popular means of transport.

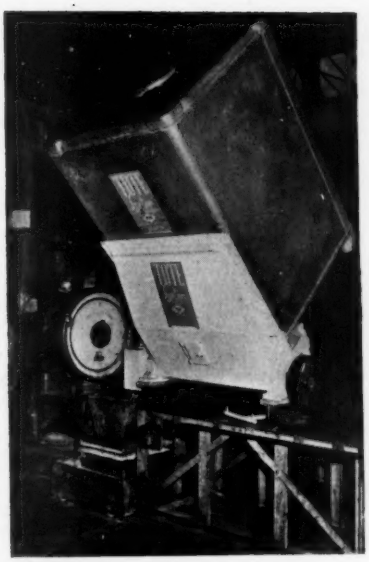


The illustrations show the general appearance of a 74 cu. ft. bin being handled by a fork lift truck, and also a bin being emptied on the Tilt Discharger.

Full details of the system including prices and delivery may be obtained from the manufacturer, Pressoturn Limited, Tote System Division, Leamington Spa.

Electric Fork Lift Truck

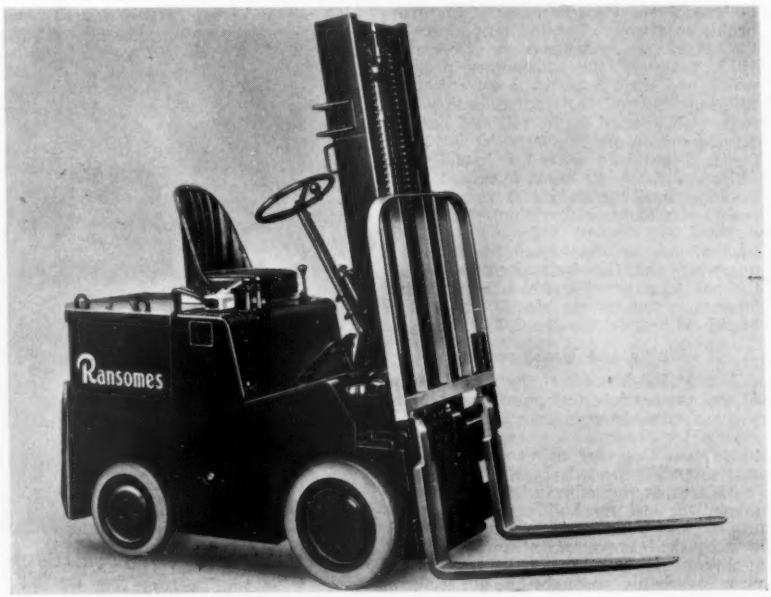
THE Forklift 3000 Truck, capable of handling loads of 3,000 lb. to a height of 14 ft., has been based on the manufacturer's previous design of the Forklift 2000. Railway applications of the machine include handling and stacking in workshops and maintenance sheds, goods yards operations, and platform handling of palletised goods between freight wagons and delivery vans.



Features of the truck include the fitting of a large 480 A.-hr. capacity battery and the control cabinet, which forms the base of the driver's seat, which is hinged to make inspection of all vital components an easy matter.

The frame of the machine is constructed to form a compact unit. The rear ballast weight is bolted to the frame, and the hydraulic oil tank welded into the frame.

Hydraulic pedal-operated brakes with internal expanding shoes and independent drums, are fitted on the driving wheels. One-shot lubrication of most moving parts is incorporated. All remaining points are fully accessible and are lubricated by



grease gun. The driving motor is of the heavy-duty high-torque traction type, horizontally mounted on ball bearings, and complying with British Standards Specification No. 1727.

The motor differential and driving axle comprise one integral unit, the driving motor being directly coupled to the worm drive. Steering mechanism operates on the rear wheels. A hydraulic pump driven by an electric motor operates the lifting and tilting mechanism through self-centralising control valves. The tilting cylinders are ball and socket mounted for automatic self-alignment and rapid disconnection of the mast uprights. Various heights of lift are available, ranging from 5 ft. to 14 ft., which adds to the machine's versatility.

A fully automatic metal rectifier is incorporated. Chargers for all types of a.c. supplies and for fully charging the battery in either 8 or 12 hr. can be offered.

Dimensions of the truck include: overall width, 2 ft. 9 in.; overall length (less forks), 6 ft. 11 in.; and wheelbase, 3 ft. 6 in.

Details of price and delivery may be obtained from the manufacturer, Ransomes Sims & Jefferies Limited, Orwell Works, Ipswich.

West of India Portuguese Guaranteed Railway Co. Ltd.

The seventy-fifth annual general meeting of the West of India Portuguese Guaranteed Railway Co. Ltd. was held in the company's office, Buckingham Palace Road, London, S.W.1, on March 27. The Chairman, Sir William Sharpe, in the course of his address, said that the revenue account for the year ended March 31, 1956, showed that the combined net earnings of the railway and harbour amounted to £51,689.

Trade of the Port

The total net volume of overseas traffic dealt with at Mormugao for 1955-56 was 1,677,467 tons, compared with 1,324,419 tons in 1954-55, the increase of 26·66 per cent being due to increased exports of ores.

General Situation

The Chairman, referring to his address in May, 1956, when he outlined the many problems arising after the termination of the Working Agreement in December, 1955, spoke of the satisfactory progress which had since been made towards their solution and of the reorganisation and expansion effected in the rail and harbour services. Iron ore exporters, having asked for and obtained extended loading and shipping facilities, had increased their bookings until the maximum train loads of ore to the harbour for export had to be doubled. A record volume of 232,000 tons of ore in one month was exported overseas; and the indications were that the net tonnage of overseas exports and imports in the current official year ending March 31, would top the 2,000,000 mark.

Works and Developments

A new 950-h.p. diesel tug, the *Moçambique*, was put into service and was proving a most valuable asset to the harbour. A new water barge with a capacity of 100 tons was ready for delivery and a new pilot launch expected shortly.

As regards the railway, the recruitment of skilled staff, the build-up of stores and provision of additional plant had resulted in a marked improvement in speed and quality of locomotive repairs, and complete overhauls were being undertaken. The standard of permanent way maintenance had also been improved.

A project was under consideration for the extension and mechanisation of No. 6 berth to be used exclusively for overseas ore exports. The mechanical conveyors and loading gear, it was estimated, should be able to handle up to two million tons of ore a year. The plans also provided for a new electric power house of greater capacity than the existing one. Other projects under consideration by the Portuguese Government included a slipway and repair yard large enough to undertake the annual repair and overhaul of the dredgers and other harbour craft. A rearrangement of warehouse accommodation and harbour railway sidings to improve handling arrangements for import cargo and the introduction of a scheme for private ownership of wagons were also contemplated.

Eastern Region Furniture Exhibition

Standard designs for offices and waiting rooms

The Eastern Region of British Railways has given careful consideration in the past two or three years to the furnishing of station waiting rooms and railway offices, especially those with public access. Waiting room furniture must be sturdy, in order to withstand rough and, sometimes, unfair treatment, but the solid and rather institutional designs which have been used for many years are quite out of accord with contemporary taste. An extensive review of manufacturers' offers led to the conclusion that nothing entirely suitable was available and by arrangement with S. Hille and Co. Ltd., of Watford, their Design Consultant, Mr. Robin Day, undertook a study of the problem. The waiting room tables, chairs and bench seats displayed at Liverpool Street recently were examples of Mr. Day's designs.

Although office furniture acquired recently has been carefully selected from a wide variety of manufacturers' standard designs, it has been found that the cheaper articles are not uniformly reliable and that better quality designs are unduly expensive. The Regional Architect was therefore asked to prepare designs and specifications for standard office furniture for clerical offices, drawing offices, senior staff, and officers.

The articles displayed were constructed to the Regional Architect's requirements and it is intended to obtain supplies by competitive tender from competent manufacturers. Experience so far goes to suggest that the new ranges will be obtainable at prices which will be very little higher than those of commercially-produced articles in the lower-cost brackets and will show substantial savings on items of better quality.

Drawing Bench Assembly

The tops of drawing benches are designed in two lengths, 9 ft. and 7 ft. They may be used in conjunction with two different types of pedestal and a leg frame. They are easily demountable and can be arranged to suit any required drawing office layout. The assembly shown in the exhibition comprised a 9-ft. and a 7-ft. bench top; a pedestal with three drawers; a pedestal with two drawers and pigeonholes with the top drawer containing a sliding equipment tray; a leg frame; and a drawing office stool. The bench tops are solidly constructed with black linoleum tops and hardwood edging. The pedestals and leg frame are finished in grey cellulose.

A senior desk assembly shown included a 5-ft. × 3-ft. desk with two pedestals with three drawers each, a type "A" bookcase, 3 ft. × 2 ft. 3 in. with glass sliding doors and one adjustable shelf, and a senior chair with padded seat and hard arms. The desk and bookcase are finished in Sapele mahogany. Two tables were shown in the same finish.

Officers' Furniture

In an "officer's room area" were shown a desk, 5 ft. 6 in. × 3 ft. 6 in., with two pedestals with three drawers each, and the top in black leathercloth; a telephone desk, 2 ft. × 1 ft. 3 in., with a cupboard with sliding doors for telephone directories

Eastern Region standard furniture including officer's desk and chair, a large bookcase, and a telephone cabinet

with an open shelf above. Both units were in Sapele mahogany. The chair shown was fully-upholstered and covered with a black and white patterned woven fabric. The carpet had a non-crushable pile. In the same area were a type "B" table, 4 ft. 6 in. × 2 ft. 6 in. and a combined unit bookcase consisting of a bookcase type "A" and a bookcase cupboard, 3 ft. × 1 ft. 6 in. × 1 ft. 6 in., with two fixed shelves and solid doors.

Clerical Office Desks

A "clerical office area" included a type "A" desk, 4 ft. 6 in. × 2 ft. 6 in. The desk has two pedestals with three drawers each. Desk type "B," not displayed, has a pedestal with three drawers and a pedestal cupboard with one shelf. Both desks are finished in Sapele mahogany. The standard chair has a padded seat and hard back. Hat and coat racks are made from stove-enamelled mild steel tubing with a satin brass hanging rail.

The typist's desk shown, 4 ft. × 2 ft. 3 in., had one pedestal with three drawers and an enclosed knee space. The desk is finished in Sapele mahogany. The chair has an adjustable seat and back.

Waiting Room Seats

The waiting room furniture shown was designed by Mr. Robin Day to the requirements of the Eastern Region, with the exception of the combined ashtray and litter bin, which was designed by the Architect, Eastern Region. There was an upholstered chair, with seat and back upholstered in hard rubber covered with Vynide. The frame was of stove-enamelled mild steel tubing with the bottom part of the legs in stainless steel. The arms were in Makore hardwood. A hard chair was similar in construction to the upholstered chair, but with seat and back in slatted Makore hardwood. There were also hard and upholstered bench seats in various sizes. The waiting room table shown had a top in solid Makore hardwood, the frame in stove-enamelled mild steel tubing, and the bottom part of the legs in stainless steel. The combined ashtray and litter bin shown has a stove-enamelled mild steel frame containing a stove-enamelled steel litter bin with a spun aluminium ashtray above. The top plate of the ashtray is in stainless steel.

The office furniture was designed by the Eastern Region Architect, Mr. H. H. Powell, under the general direction of Mr. A. K. Terris, Chief Civil Engineer. The waiting room furniture was designed by Mr. Robin Day, Design Consultant to S. Hille & Co. Ltd., of Watford, who manufactured the waiting room furniture.

RICHARD THOMAS & BALDWINS LIMITED.—Lower profits and an unchanged dividend of 13½ per cent are announced by Richard Thomas and Baldwins Limited. Manufacturing and trading profit of the group for the year to September 29, 1956, amounted to £10,075,840, against £11,299,650 for the previous year. After adding income from investments and interest receivable, and providing £2,008,490 (£1,742,862) for depreciation and £4,056,397 (£4,443,168) for taxation, the net profit works out at £4,313,848 (£5,578,252). The directors allocate £1,200,000 (£1,660,000) to fixed assets replacement reserve. A transfer of £1,866,439 (£3,124,785) is also made to general reserve and the balance carried forward is raised to £7,488,464 against £7,191,971 brought in.

Institution of Railway Signal Engineers

At a meeting of the Institution of Railway Signal Engineers held in London on February 19, at which the chair was taken by the President, Mr. J. C. Kubale, a lecture entitled "Radio and Television Aids to Railway Operation" was given by Brigadier E. J. H. Moppett and Mr. I. Waters. The lecture was illustrated by lantern slides and a short film, also a demonstration was given of some of the equipment described.

Brigadier Moppett stressed that the standard signalling system of a railway must be paramount, but he went on to show how the use of radio resulted in more efficient operation, increased safety, and sometimes the saving of man-power. He described some of the operational radio telephone systems in use on the major American Railways and the benefits obtained from them. Whilst the greatest contribution to efficiency and safety came from the use of main line radio systems, widespread use had been made in this country, in the U.S.A., and on the Continent of Europe of radio telephony for shunting and marshalling yard operation generally. British Railways, large industrial concerns and dockyards had substantial numbers of shunting locomotives fitted with radio. American railway radio equipment tended to be rather heavy and cumbersome, but sets manufactured in this country for British Railways were of lighter construction.

Methods had been devised of working on much narrower channel spacing than previously, which would solve the difficulty of frequency shortage for railways and other operators for many years.

Dealing with closed circuit television for industrial purposes, Mr. Waters described the reasonably priced equipment and its uses both in this country and elsewhere. He suggested how greater use of this type of equipment could be made on the railways and gave a number of examples where it would be beneficial, including such purposes as goods yard shunting, remote signal control, passenger service, and the control of level crossings.

Mr. J. C. Kubale opening the discussion, said that, considering the use of radio in taxi services, there must be a great application for it on the railways, and in the sphere of signalling there would be considerable use for the devices demonstrated that evening.

Mr. R. Dell, referring to V.H.F. radio, stated that, in his experience, interference impairing the clarity of speech presented a serious problem. He drew attention to the fact that if equipment was to be used on the railways, a minimum life of 20 years was necessary and that spare parts should be obtainable over that period.

Colonel G. R. S. Wilson felt that the use of radio communication for the control of trains, except in one or two instances, would be too costly, in view of the fact that in this country there was a close telephone network and a closely signalled railway system. With colour-light signalling, which was being greatly extended under the British Transport Commission modernisation plan, there was a telephone at every signal. With regard to television, it had, in fact, been considered for the remote control of level crossings in this country.

Mr. L. G. Smaldon, who was interested in level crossing protection, stated that concave and convex mirrors were used to enable a signalman to observe the whole of a crossing, and he asked how a television camera would cover the "blind spots."

Mr. L. W. H. Lowther said that, bearing in mind the modern advancements being made, he could not help feeling that there was a good deal in conveying a simple, unmistakable meaning to the driver of a train and he did not like anything which took away from what was known as a fixed signal.

Mr. E. G. Brentnall mentioned that a good deal of development in radio had taken place in this country on the railways in various directions. If there was not equipment on trains, there were signal boxes fitted with it. A very limiting factor was the amount of frequency band allocated to railways and the question of interference. For a number of years, a large amount of research work had been carried out in Germany with regard to the use of television for operational purposes on the railway, and from the conclusions obtained from the tests made, Mr. Brentnall quoted the requirements which must be fulfilled by television sets for operational use.

Colonel D. McMullen asked what would be the effect of a fairly thick fog on a television camera used at a level crossing.

Mr. J. V. Goldsbrough appreciated what chaos could be caused by improper use of radio channels and enquired whether the same channel could be in use at opposite ends of an area without interference being experienced.

Mr. A. J. Mullarkey asked how many monitors a television camera was capable of supplying; the length of cable used between the monitor and the camera; and whether the replacement of cathode ray tubes was the major replacement cost.

Mr. S. H. Barrs asked for some typical examples of the type of information passed from signalman to moving trains in a congested zone on the American Railways, as he was concerned over the possibility of a misunderstanding.

After Brigadier Moppett and Mr. Waters had replied to the points raised, Mr. Kubale proposed a cordial vote of thanks to them for a most instructive and interesting lecture.

NEW FIRE STATION AT CREWE WORKS.—The Crewe Works Fire Brigade of British Railways, London Midland Region, answered the first call—a practice one—from its new fire station on April 10. The alarm was sounded for an inaugural turnout of the brigade after the opening of the new station by Mr. I. C. Forsyth, the Works Manager, at 2.55 p.m. The new station, which replaces a timbered building, is on an approach road to the works. It covers an area of some 1,200 sq. ft. and has a spacious appliance room for the brigade's two high-powered pump and ladder machines and trailer pumps. The station is similar to that of a local authority and includes an office and store accommodation. The premises are electrically heated and have modern lighting. The appliances are fitted with immersion heaters to keep the motors warm for quick starting, and there are facilities for battery charging. The building was designed by the London Midland Region Architect and built by Crewe Works building staff. The Crewe Locomotive Works Fire Brigade has a full-time fire captain and 20 part-time firemen.

Questions in Parliament

Victoria Line

Mr. Ernest Davies (Enfield E.—Lab.) asked the Minister of Transport & Civil Aviation on April 10 what consultations he had had with the B.T.C. in regard to the construction and financing of the new Victoria line tube; and what action he proposed to take.

Mr. Harold Watkinson: My discussions with the Commission in regard to this scheme have not yet reached a stage at which I can usefully make any statement. In reply to a supplementary question, he stated that the Commission was actually examining the scheme, and until it came back to him there was no further action that he could take.

Transport of Motorcars by Rail

Mr. C. N. Thornton-Kemsley (Angus N. and Mearns—N.L.U.) asked the Minister of Transport & Civil Aviation on April 10, in view of the need to conserve petrol during the period of rationing, if he would give a general direction to the B.T.C. to extend its facilities for the transport of private motorcars by rail on favourable terms to distant centres of attraction to tourists during the coming summer.

Mr. Harold Watkinson: Further services of this kind are being introduced this summer to the greatest possible extent.

Mr. Thornton-Kemsley said that answer would give great satisfaction, not only to those who had been wondering what they could do about getting their cars to distant places, but to many hotels and boarding-house keepers, who had been anxious about the situation.

Mr. Ernest Davies: Does this not show the initiative and enterprise that the nationalised British Railways has been taking in this matter?

Mr. Watkinson: Yes, indeed; it shows what a good commercial, practical concern it is becoming.

Newhaven-Dieppe Steamship Service

Mr. Ernest Davies (Enfield E.—Lab.) asked the Minister of Transport & Civil Aviation on April 10 if he would refer the matter of the future operation of the Newhaven-Dieppe steamship service to the South-Eastern Transport Consultative Committee for its consideration and recommendations.

Mr. Airey Neave, Joint Parliamentary Secretary: No; passenger services on this route were reintroduced on April 5 and summer services will be on the same scale as last year.

Mr. Davies said the service had been started only for the summer period and has to close down in the autumn. As the explanation of the closure was that it would save oil and as, presumably, by the autumn the oil situation would have improved, could steps be taken to keep the service open.

Mr. Neave stated that the conduct of the service was a joint matter for the French Railways and the B.T.C., French railways being the senior partner. If it were necessary to examine the future of the Commission share of the service. He hoped that that could be considered by the Transport Users' Consultative Committee.

Mr. Davies asked for an undertaking that before the service was closed down, the matter would be referred to the South-Eastern, Transport Consultative Committee so that it would have an opportunity to consider the matter before a final decision was taken?

Mr. Neave: I can certainly say that it will be open to the Committee to consider the matter if it becomes necessary to examine the future of the service.

Channel Tunnel

Mr. John Cronin (Loughborough—Lab.) asked the Minister of Transport & Civil Aviation on April 10 if he would make a statement as to Government policy on the construction of a Channel tunnel.

Mr. Watkinson: Consideration is now being given as to whether recent developments call for any change in policy.

Mr. R. Gresham Cooke (Twickenham—C.) asked the Minister to bear in mind that the tunnel should have a road section as well as a rail section.

Mr. Watkinson stated that so far no plans had been found feasible for a road tunnel, and a rail tunnel alone would probably cost £100 million.

Contracts and Tenders

The Railway Board of India have placed the following contracts in connection with the 1957-58 rolling stock programme:—

D. Wickham & Co. Ltd., Ware, Herts: nine tower wagons for inspection of overhead electrical equipments, self-propelled diesel-powered complete unit without superstructure

Cantieri Riuniti Dell Adriatico-Officine Materialex Ferroviario Ex Aeronautico-Manfalcone, Italy: 19 BG caustic soda tank wagons, at a unit price of £1,153 for delivery in May 1958

Duescher Innen Undaussenhandel, Berlin: 17 BG 55-ton bogie well wagons, at a unit price of £4,150 for delivery in September 1957.

British Railways, North Eastern Region, have placed the following contracts:—

Wright Anderson & Co. Ltd., Gateshead: crane gantry and hoist runways, Dinsdale

Tarslag Limited, Stockton-on-Tees: bridge No. 22, reconstruction and widening, Sherburn Colliery

Leonard Garbutt Limited, Aberford: new signalbox, Milford South

T. Belt & Son Limited, York: additional accommodation for Signal Engineer, York old station buildings.

The Special Register Information Service, Export Services Branch, Board of Trade, has received a call from India for diesel locomotives, tipping wagons, and hoppers as follows:—

1. diesel locomotives suitable for narrow gauge
2. tipping wagons 1 cu. yd. and 2 cu. yd. suitable for narrow gauge
3. flat cars for carrying 3 cu. yd. buckets suitable for narrow gauge
4 hoppers 2 cu. yd. capacity for mortar
5. diesel electric or diesel hydraulic locomotives suitable for metre gauge.

Sealed tenders will be received by the Executive Engineer, Mechanical & Workshop Division, Nagarjunasagar Dam, Vijayapuri North, Nalgonda Dt., Andhra Pradesh, for items 1 and 2 on May 20, item 3 on May 22, item 4 on May 23, and item 5 on June 17, 1957. The tender No. is 2/MIW. Earnest money for item 1 is Rs. 15,000, for items 2 and 5, Rs. 30,000, and for items 3 and 4, Rs. 4.000. No further information regarding this call for tender is available at the Branch (Lacon House, Theobalds Road, W.C.1). The reference ESB/10018/57 should be quoted in any correspondence with the Branch.

The Special Register Information Service, Export Services Branch, Board of Trade, has received a call from the International Co-operation Administration (I.C.A.) for India for steel rails, fish plates, and sleepers, as follows:—

5,550 tons basic open hearth medium manganese RBS rails 60 lb. in 30 ft. length with 10 per cent short down to 27 ft. rising by 3 ft.

725 tons fish plates to suit 90 lb. RBS M. M. quality rails

2,000 tons steel sleepers (M.G.) for 50 lb. rails

6,000 tons steel sleepers (M.G.) for 60 lb. rails

17,959 tons steel sleepers (B.G.) for 90 lb. rails.

The project implementation order No. is 86-660-99-81-6203. The issuing authority and address to which bids should be sent is the Government of India, Ministry of Heavy Industries, Iron and Steel Control, 33, Netaji Subhas Road, Calcutta-1. This purchase will be financed by the International Co-operation Administration (I.C.A.), the agency through which the United States Government gives economic and technical assistance to underdeveloped countries. The closing date is May 3, 1957. Copies of specifications and other documents relating to calls for tender under I.C.A. aid can generally be obtained from the India Store Department, Government Building, Bromyard Avenue, Acton, London, W.3. A copy of the specifications and conditions applying to this particular call for tenders may be inspected in Room 728 at the Branch (Lacon House, Theobalds Road, W.C.1). An additional copy is available for loan on application. Photo-copy sets of the documents can be obtained at a cost of 26s. from the Branch. Cheques and postal orders should be made payable to the Principal Accountant, Board of Trade. Firms wishing to collect photo-copy sets of tender documents are advised to notify the Branch in advance of their requirements. The reference E.S.B./9300/57/I.C.A. should be quoted in any correspondence with the Branch.

The Special Register Information Service, Export Services Branch, Board of Trade, has received a call from India for signalling equipment as follows:—

12 three-position U.Q. "A" type fittings modified for through spindle for tubular post including roundels stop arm lamp and down rod, but without mechanism (3/4, 37/38) red, yellow and green. S. & F. No. IC 5827 or similar (Ref. No. F2A—NS)

36 two-position U.Q. "A" type fittings modified for through spindle for tubular post including roundels stop arms lamp and down rod, but without mechanism (5, 36 red and yellow) (12, 13, 28, 29 red and green) S. & F. No. IC 5927 or similar (Ref. No. F2A/NS)

12 three-position U.Q. "A" type fitting modified for a through spindle for tubular posts, including roundels, stop arm lamp and down rod, but without mechanism (1/2, 39/40 yellow, yellow and red and green). S. & F. No. IC 5827 or similar (Ref. No. F2A/NS)

24 double wire upper quadrant shunt signal (without mechanism) S. & F. No. IA 7201 or similar (Ref. No. F2A/NS).

The issuing authority is the Director-General of Supplies and Disposals. The tender No. is SRIA/18840-G/V(C). Bids should be sent to the Director-General of Supplies and Disposals, Shahjahan Road, New Delhi. The closing date is May 7.

1957. A set of tender documents but not specifications is available for loan to United Kingdom firms on application to the Branch (Lacon House, Theobalds Road, W.C.1). A photo-copy set can be purchased from the Branch for 17s. Cheques and postal orders should be made payable to the Principal Accountant, Board of Trade. Firms wishing to collect photo-copy sets of tender documents are advised to notify the Branch in advance of their requirements. The reference ESB/9117/57 should be quoted in any correspondence with the Branch.

The Special Register Information Service, Export Services Branch, Board of Trade, has received a call from India for signalling equipment as follows:—

200 typical unit detector layouts, one or two way, complete with all necessary parts as shown on the drg. No. SA-5800, alt. 2, with alternative components consisting of signal slide, type "B" complete to IRS drg. No. SA-5808, alt. 1, and shoe joint (butt end) IRS drg. No. S-5817 on (S-5817-SA, 5817-C) alt. 3 and to IRS specn. No. 5-10-56 and as specified on part drgs.

The issuing authority is the Director-General of Supplies and Disposals. The tender No. is SRIA/18966-G/V(B). Bids should be sent to the Director-General of Supplies and Disposals, Shahjahan Road, New Delhi. The closing date is May 8, 1957.

A set of tender documents, but not specifications and drawings is available for loan to United Kingdom firms on application to the Branch (Lacon House, Theobalds Road, W.C.1). A photo-copy set can be purchased from the Branch for 16s. Cheques and postal orders should be made payable to the Principal Accountant, Board of Trade. Firms wishing to collect photo-copy sets of tender documents are advised to notify the Branch in advance of their requirements. The reference ESB/9396/57 should be quoted in any correspondence with the Branch.

The Special Register Information Service, Export Services Branch, Board of Trade, has received a call from India for shunt signals as follows:—

36 shunt signals one arm, complete with all parts as listed on the drg. and to I.R.S. drg. No. SA-2427 alt. I and to I.R.S. specn. No. S-10-56 and as specified on part drawings.

The issuing authority is the Director General of Supplies and Disposals. The tender No. is SRIA/24036-H/V(C). Bids should be sent to the Director General of Supplies and Disposals, Shahjahan Road, New Delhi. The closing date is May 9, 1957.

A set of tender documents excluding specification and drawings is available for loan to United Kingdom firms on application to the Branch (Lacon House, Theobalds Road, W.C.1). A photocopy set can be purchased from the Branch for 16s. Cheques and postal orders should be made payable to the Principal Accountant, Board of Trade. Firms wishing to collect photo-copy sets of tender documents are advised to notify the Branch in advance of their requirements. The attention of United Kingdom firms is drawn to a booklet issued by the Government of India entitled "Conditions of Contract Governing Department of Supply Contracts," a copy of which is available for inspection at the Branch. The reference ESB/9397/57 should be quoted in any correspondence with the Branch.

Notes and News

The Transportation Club.—A club cocktail party will be held at the Transportation Club, 44, Wilton Crescent, S.W.1, on May 7, at 6 p.m.

Profit for Channel Tunnel Company.—The annual report of the Channel Tunnel Co. Ltd., shows a net profit for the year of £545, making the credit balance £13,184. The income arises mainly from investments. The balance-sheet shows as fixed assets £89,101, which includes expenditure on experimental workings. The company's capital is £91,351, made up of 456,757 shares of 4s. each.

BTH at I.E.A. Exhibition 1957.—Among the exhibits on the stand of the British Thomson-Houston Co. Ltd. at the I.E.A. (Instruments. Electronics & Automation) Exhibition, which will be held at Olympia, London, on May 7-17, will be the BTH Clearcall carrier-frequency industrial communication equipment. The system provides a two-way communication between, for example, the drivers of leading and banking electric locomotives, hauling a train, when use is made of the power conductor rail or overhead wire. This equipment was described and illustrated in our issue of November 19, 1954.

Emergency Signalling at Cannon Street.—The hand signalling arrangements at Cannon Street station, Southern Region, where the signalbox was destroyed by fire on April 5, have been improved to allow the number of electric trains in the three-hour peak to be increased from 19 to 25. The normal three-hour peak service comprises 52 electric and 11 steam trains. No steam trains are being taken into Cannon Street because of the extra movements required compared with electric trains. The temporary frame to be brought into use next month will have 47 levers and allow full use to be made of five of the eight platforms, by electric trains only. The new permanent signalbox, a frame for which has been supplied by the London Midland Region from its stocks at Crewe, will deal with 41 routes into and out of the station. It will control 14 running signals, 39 shunt signals and 41 point machines. As reported in our issue of April 19, Sir Brian Robertson, Chairman of the British Transport Commission, visited Cannon Street on April 15. The accompanying illustration shows (left to right, commencing third from left): Mr. L. J. Boucher, Signal Engineer; Mr. S. A. Fitch, Chief Operating Superintendent; Sir Brian Robertson; Mr. C. P. Hopkins, General Manager; and Mr. A. Earle Edwards, District Traffic Superintendent, Orpington, Southern Region.

B.E.D.A. at the Factory Equipment Exhibition.—The release of manpower for vital work by using electric control will be the theme of the exhibit by the British Electrical Development Association at the Factory Equipment Exhibition at Earls Court, from April 29 to May 4, 1957. Many electric and electronic devices, mostly operating, will stress their tireless, high speed and accurate operation, which enable production to be speeded up and men to be freed for more appropriate work.

Road Haulage Surcharge Reduced.—The national rates committee of the Road Haulage Association recommended on April 17 that the 10 per cent emergency surcharge imposed by members of the Association last December to meet higher fuel costs should be reduced with effect from April 15. A reduction of two-thirds is proposed but the committee is to meet again in the near future to consider the effect of cost changes, including expected increases in basic wages, on road haulage rates.

Staggered Hours Proposals for Mayfair.—The Mayfair area, which has the worst peak-hour travel problem in London, is being given priority in the Ministry of Transport drive to improve peak-hour travel. More than half the 80,000 employees of firms in the area leave work at 5.30 p.m. and the position is made worse by shopping crowds. The newly-formed Mayfair Zone Staggered Hours Committee has asked 90 out of 422 of the larger firms to finish work 15 or 30 min. earlier. Some firms have been asked to finish work before 5 p.m. on three nights a week, including the Thursday late shopping night, and at 6 p.m. or

Sir Brian Robertson with Mr. C. P. Hopkins and chief officers of the Southern Region on a visit of inspection at Cannon Street Station

6.15 on the remaining nights. Five other Central London Zone Committees have been set up to plan co-ordinated schemes for staggered hours in their zones.

Beyer, Peacock & Co. Ltd. Results.—The final ordinary dividend of Beyer, Peacock & Co. Ltd. for 1956 is raised to 6 per cent, against 3½ per cent for 1955. The bonus is reduced from 8½ per cent to 6 per cent, thus maintaining total distribution for 1956 at 16 per cent. Group profits for 1956 were £235,972 (£274,434) after all charges, including tax of £276,336 (£291,221).

Railway Benevolent Institution.—At a meeting on April 16 the board of the Railway Benevolent Institution granted annuities to eight widows and six members involving an additional liability of £245 per annum. Ninety gratuities were also granted amounting to £790 to meet cases of immediate necessity. Grants made from the Casualty Fund during the month of March amounted to £1,595.

Improved Western Region Passenger Train Facilities.—The Western Region introduced on April 1 new express business services between Paddington and Bristol and between Birkenhead and Cardiff. The Paddington-Bristol service runs on Mondays to Fridays, leaving Paddington at 3.5 p.m., calling at Swindon (depart 4.22), arriving at Bristol at 5.15. In the return direction, the train leaves Bristol at 6.10 p.m., calling at Bath (depart 6.28) and arriving Paddington at 8.15. The train from Birkenhead, which runs each weekday, provides a much improved link between North and South Wales via Chester, Shrewsbury, and Hereford. The forward service leaves Birkenhead at 7.50 a.m., due Cardiff at 12.22 p.m., giving connections at Chester from the 6.45 a.m. Bangor and 7.8 a.m. from Llandudno. The return evening train leaves Cardiff at 4.15 p.m. arriving Birkenhead at 8.42, connecting at Chester with the 8.20 to Llandudno. A refreshment car is provided on both routes in each direction.

Channel Tunnel Committee Revived.—At a meeting at the House of Commons on April 16, the Channel Tunnel Committee was re-formed, with Mr. William Teeling, Member for the Pavilion division of Brighton, as Chairman, and Messrs. F. M. Bennett and E. L. Mallalieu as joint hon. secretaries. A talk was given by a consulting engineer on the technical problems involved in building a tunnel. A further meeting was arranged to prepare a report on policy.

G.W.R. Special Trainees' 26th Reunion.—The 26th reunion of the Great Western Railway special trainees took place on April 12 at the Great Western Royal Hotel, Paddington. The arrangements this year were in the hands of the trainees selected in 1929 and the chair was taken by Mr. A. F. Walton, Operations Manager of B.R.S. (Parcels) Limited, in the absence of Mr. L. J. Hamblin, Industrial Relations & Welfare Officer, British Transport Commission, who was unable to attend. The function was a very successful one and was attended by 34 members of the old Training Scheme. The toast to "British Railways" was proposed by Mr. W. Griffiths, District Commercial Manager, Shrewsbury, and responded to by Mr. J. W. J. Webb, the Regional Accountant at Paddington. The toast to "Colleagues overseas" was proposed by Mr. E. Havers, Assistant (Mineral) to the Chief Commercial Manager, Western Region. Presentations were made to three trainees who retired during the last 12 months, Messrs. R. H. Windsor, C. E. Shaw, and B. H. Bristow. Mr. Windsor was formerly Assistant to the District Passenger Manager, Birmingham; Mr. Shaw, District Commercial Manager, Bristol; and Mr. Bristow, Welfare Officer, Establishment & Staff Office, Paddington. Special reference was made by the Chairman during the reunion to the conferment in the New Year Honours List of the K.B.E. on Sir Arthur Kirby, General Manager of East African Railways & Harbours, who is retiring this year and hopes to be present at next year's reunion.

Southern Region Publicity

A British Railways steamer on the Portsmouth—Ryde service and yachting in Spithead depicted in a new poster produced by the department of the Public Relations & Publicity Officer, Southern Region

French Railway Strike Ended.—The French 48-hr. transport strike, which affected train, bus, Paris Métro, and air services, ended as expected at midnight on April 18. Full services were resumed on April 19 in time for most of the Easter holiday traffic. Some trains were running on April 18 and the remainder resumed running from midnight. Ten express trains are reported to have left Lyon Perrache station in the first 98 min. after midnight. There are fears that the strike, intended as a warning, may be resumed if wage increases are not granted in the public transport services.

Derwent Valley Light Railway Results.—The annual report of the Derwent Valley Light Railway Company for the year ended December 31, 1956, shows that gross traffic receipts amounted to £26,127 compared with £24,041 in 1955. Expenditure was £21,389 (£19,393), leaving net traffic receipts at £4,738 (£4,648). Miscellaneous receipts, including rents from houses and lands, amounted to £3,937 (£3,135), making the net revenue for the year £8,675 (£7,783). To this is added £3,395 (£3,368) brought forward from the previous year. Dividends of 5 per cent on both preference and ordinary shares are recommended. Tonnage carried rose from 57,441 in 1955 to 62,679.

Westinghouse Share Issue.—The directors of the Westinghouse Brake & Signal Co. Ltd. have decided to make a "rights" issue of 1,777,356 ordinary shares of £1 each at 35s. per share payable as to 20s. per share on acceptance on or before May 8, 1957, and the balance of 15s. per share on or before July 17, 1957. Provisional allotments have been made to stockholders of the company on the basis of two new shares for every three units of £1 ordinary stock of the company held at the close of business on April 1, 1957 (fractions of a new share being disregarded), except as regards the Consolidated Signal Co. Ltd. which held at that time £395,500 ordinary stock of the company. Consolidated is entitled to a provisional allotment of 263,666 shares and, by arrangement, provisional allotments have been made direct to the ordinary stockholders of Consolidated on the basis of seven new shares of the company for every £4 ordinary stock of Consolidated held at the close of business on April 1, 1957 (fractions of a new share being disregarded), and a provisional allotment has been made to Consolidated of the balance.

Improved Facilities at Doncaster Carr Motive Power Depot.—Work has now begun on the reconstruction of the running shed roof and provision of improved locomotive maintenance facilities at Doncaster Carr motive power depot, Eastern Region. The additional maintenance accommodation is to be made available by removing No. 10 line, filling in the inspection pit in the running shed and constructing a

partition approximately along the line of the removed track to separate the present No. 11 and 12 lines from the rest of the shed. The partition will be of asbestos cement sheeting on steel framing and uprights. Reconstruction of the running shed roof is to be carried out using asbestos cement roof crown units and sheeting with rooflights on the pitched portions, supported on new steel tied rafter trusses. Specially designed asbestos cement smoke chutes are also to be installed in the running shed. All the asbestos cement sheeting used will be treated with vinyl acid resisting paint, impervious to sulphurous smoke. Modern electric lighting is to be installed in the depot and new compressed air and hot water facilities for locomotive maintenance provided. The general contractor is George Simpson (London) Limited.

Skefko Ordinary Dividend as Last Year.—The chairman of the Skefko Ball Bearing Co. Ltd., Sir Victor Mallett, will recommend, at the annual meeting to be held on May 16, that the ordinary dividend be held at 10 per cent, with an unchanged final payment of 7½ per cent, as last year. Profits for 1956 rose to £442,791 from £414,915 for 1955, after tax of £1,130,000 (£1,023,500); reserve for possible future reductions in stock values of £350,000 (£250,000) and other provisions of £73,000 (£40,500).

Jonas Woodhead & Sons Ltd.—Despite difficult conditions in the motor industry during a large part of the trading year to September 30, 1956, the directors of Jonas Woodhead & Sons Ltd., vehicle suspension specialists, report a record turnover for the group. However, the ratio of profit continued to be restricted by increases in costs which could not be passed on to consumers. Consolidated trading profits expanded from £313,912 to £409,192 and the net balance attributable to the holding company of £81,880 compares with £78,004. The 15 per cent dividend is repeated.

Coach-Air Service to France.—A new low-fare coach-air service to Southern France is to be operated by Skyways Limited, an independent air transport operator, from May 9. Initially, the service will operate at a frequency of four services each way every week, and the inclusive return fare between London and Nice will be as low as £19 15s., subject to Government approval. The new service will consist of a coach journey from Victoria to Lympne; then by Skyways DC-3 airliners to Lyons, whence the journey to Nice is concluded by motorcoach via the scenic Route des Alpes. The total journey times, centre of London to centre of Nice, will be about 15 hr.

Hawker Siddeley Offer for Brush Group.—The Hawker Siddeley Group has made a share exchange offer worth more than £6,000,000 for the whole of the existing issued share capital of the Brush Group; the offer is of one cumulative preference £1 share of Hawker Siddeley Group in exchange for one Brush 5½ per cent cumulative preference stock unit of £1; four new Hawker Siddeley ordinary shares of £1 each in exchange for five Brush 6 per cent cumulative convertible redeemable preference stock units of £1; and one new Hawker Siddeley ordinary share of £1 in exchange for five Brush ordinary stock units of 5s. The new Hawker Siddeley ordinary shares offered in exchange for the Brush securities will rank for full dividend in respect of the year ending July 31, 1957. The offer is conditional on acceptance by the holders of 90 per cent in value of the total issued capital of the Brush Group, or such smaller percentages as the Hawker Siddeley Group may decide, and is subject to the necessary formalities. The directors of the Brush Group are to recommend stockholders to accept these offers. The Brush Group is to acquire from Allmanna Svenska Elektriska Aktiebolaget (ASEA) Sweden, the entire share capital of Asea Electric Limited, Walthamstow.

Emu Bay Railway Co. Ltd. Dividends.—Astral Development Limited announces receipt of a cable from the Emu Bay Railway Co. Ltd., Melbourne, advising that it is paying on April 1, 1957 to holders of the 4½ per cent irredeemable debenture stock, the balance of interest for the year ended December 31, 1956 (2¼ per cent). Payment is also being made to holders of the 5 per cent irredeemable debenture stock of the balance of interest for the year ended December 31, 1956 (2½ per cent). The transfer books will be closed from March 16 to April 1, both days inclusive.

Pyrene Co. Ltd. Fire Research Development.—A new Research & Development division has been established by the Pyrene Co. Ltd. Its function will be to further improve co-ordination between the various fire research, development and experimental activities carried out within the company. Making this announcement, Mr. F. A. Harrison, Chairman and Managing Director, stated that the new arrangements are intended to facilitate the development and introduction of new products and the improvement of existing products. Increasing activity in these fields make this expansion particularly desirable at this time.

Asquith Machine Tool Corporation Limited Dividend.—A group net profit of £333,675, after tax, is announced by the Asquith Machine Tool Corporation Limited for the year ended September 30, 1956. This compares with £294,031 for the previous year. Taxation took £332,700 (£307,600). The profits for the year under review include those of George Swift & Sons (Holdings) and its subsidiaries. A final ordinary dividend of 15 per cent maintains 25 per cent for the year on capital increased from £540,000 to £670,000 by an issue of shares against the acquisition of George Swift & Sons (Holdings).

S.R. Lecture & Debating Society's Successful Year.—The final meeting of the 1956-57 session of the British Railways (Southern Region) Lecture & Debating Society was held at the Chapter House, London Bridge, on March 20, under the chairmanship of the Society's President, Mr. C. P. Hopkins, General Manager, Southern Region, in the presence of a number of principal officers of the Region. The evening was devoted to the reading of the winning entry in the Prize Essay Competition, and the presentation of a prize to the author, Mr. R. A. Williams, Chief Commercial Manager's Office, Waterloo. The President said he was gratified at the increased response this year, apparently the result of allowing contestants to choose their own subjects within wide limits. Mr. Hopkins was unanimously re-elected President for the 1957-58 session and the principal Regional Officers were again invited to serve as Vice-Presidents. Mr. H. C. Walter and Mr. J. M. Leighton Bailey were re-elected Chairman and Vice-Chairman of the Society respectively. The other officers of the Society were all elected for a further year, including the hon. secretary, Mr. D. R. Southey; hon. treasurer, Mr. R. J. Parsons; and hon. librarian, Mr. D. E. Riddall. During the past year membership for the first time exceeded 2,000.

Glasgow Railway Recruiting Centre.—Sir Ian Bolton, Chairman of the Scottish Area Board of the British Transport Commission, on April 23 officially opened the new staff recruitment centre for the Scottish Region of British Railways at 4, West George Street, Glasgow (adjacent to Queen Street Station). He was accompanied by Mr. G. W. Stewart, Assistant General Manager, and Mr. D. F. Gowen, Regional Establishment & Staff Officer.

Metropolitan-Vickers at the Instruments, Electronics & Automation Exhibition.—The Metropolitan-Vickers Electrical Co. Ltd. will occupy a stand at the Instruments, Electronics & Automation Exhibition, to be held at Olympia, London, on May 7-17. A prominent exhibit will be the Metrovick type 950 electronic digital computer, designed for use in solving a wide range of mathematical, scientific and engineering problems. Other exhibits will include the Magistor photo-transistor relay, a magnetic timer for spot welding machines, an electro-pneumatic converter for motor speed control, and a type MS6L mass spectrometer for the detection of leakages in pressurised or vacuum systems.

New Signalbox at Harringay Park Junction.—The Eastern Region is to build a new signalbox at Harringay Park Junction, on the former Tottenham & Hampstead Joint line, which will replace the existing box and two others at Harringay Park Station and Crouch Hill respectively. Work is to be completed by the end of the year. The new box will adjoin the existing Harringay Park Junction box and will signal trains to and from South Tottenham Junction box to the east and to and from Upper Holloway box to the west. Facilities for through working, controlled from the new signalbox, will ensure that efficiency is not diminished consequent on the abolition of the two block posts at Crouch Hill and Harringay Park Junction. The junction points for the spur to Ferme Park will be operated mechanically from the new box and connections at Harringay Park Station worked from a ground frame at that point, electrically released from the new signalbox. Construction will be of brick; the box will be set into the embankment by means of a reinforced concrete retaining wall. The standard British Railways design is to be used, with a 25-lever mechanical frame.

Forthcoming Meetings

Open currently and until further notice.—British Transport Commission: Historical Exhibition "Transport Treasures" in Shareholders' Meeting Room, Euston Station, from 10 a.m. to 6 p.m. on weekdays, and 2 to 6 p.m. on Sundays. Admission 6d.

April 27 (*Sat.*).—Railway Correspondence & Travel Society, South of England Branch, at the Y.M.C.A. Library, Friar Street, Reading, at 6.30 p.m. Paper on "Distribution of rolling stock," by Mr. A. N. Legg, of the Rolling Stock Section, Chief Operating Superintendent's Office, Western Region, Paddington Station.

April 27 (*Sat.*).—Railway Correspondence & Travel Society, Lancs and North-

West Branch, at All Saints' Rectory, Droylsden Road, Newton Heath, Manchester, 10, at 6.30 p.m. Paper on "Some railway byways of North Somerset," by Mr. W. R. Dyer.

April 27 (*Sat.*).—Railway Correspondence & Travel Society, Sussex and Kent Branch, at the Railway Hotel, Brighton, at 7 p.m. Paper on "The main line services of the L.B.S.C.R., by Mr. O. J. Morris.

April 30 (*Tue.*).—Railway Correspondence & Travel Society, East Midland Branch, at Nottingham at 7.30 p.m. Paper on "From Webb compound to Claughton," by Mr. J. F. Clay.

April 30 (*Tue.*).—Institute of Transport, at the Connaught Rooms, Great Queen Street, London, W.C.2, at 12.30 for 1 p.m. Informal luncheon. Principal guest: Mr. Gerard d'Erlanger, Chairman of B.O.A.C.

May 3 (*Fri.*).—The Railway Club, at 57, Fetter Lane, London, E.C.4, at 7 p.m. Paper on "The beginnings of the London & Southampton Railway," by Mr. K. G. Carr.

May 4 (*Sat.*).—Permanent Way Institution, London Section. Joint visit to Edinburgh and district with Edinburgh Section members.

May 6 (*Mon.*).—"Historical Model Railway Society, at the Headquarters of the Stephenson Locomotive Society, 32, Russell Road, London, W.14, at 7 p.m. Paper on "The Greenwich branch of the S.E.R.," by Mr. O. J. Morris.

May 10 (*Fri.*).—Permanent Way Institution, Manchester and Liverpool Section. Visit to Mersey Tunnel installations, Liverpool. Limited to 20 members.

May 11 (*Sat.*).—Permanent Way Institution, Leeds and Bradford Section. Visit to J. G. Eccles & Co. Ltd., Road Materials and Slag Works, Scunthorpe, Lincs.

May 11 (*Sat.*).—Permanent Way Institution, East Anglia Section, at Ipswich, at 2.15 p.m. Film: "Steel road," by courtesy of the United Steel Companies Limited, Sheffield.

OFFICIAL NOTICES

TRAFFIC FOREMAN required by Iron Works, Nr. Sheffield. Apply with full details of experience to Box 325, *The Railway Gazette*, 33, Tothill Street, London, S.W.1.

DISTRICT (CIVIL) ENGINEER required by British Railway Company operating Chile. Sterling salary, allowances, retirement benefits, free quarters, passages, home leave, etc. Write to Box 819, c/o Charles Barker & Sons Ltd., Gateway House, London, E.C.4.

VACANCIES exist at Chippenham, Wiltshire, for DRAUGHTSMEN or DRAUGHTSWOMEN, experienced in the preparation, from clients' plans, of illuminated railway track diagrams. Interesting work in connection with large railway modernisation schemes. 5-day week. Contributory Pension Scheme. Write, giving details of past experience, to Personnel Superintendent, Westinghouse Brake & Signal Co. Ltd., Chippenham, Wilts, quoting Ref. No. DO/N/H.

THE HIGH COMMISSION OF INDIA.—Applications are invited for one post of DRAUGHTSMAN (ENGINEERING), to work in the Railway Inspection Branch, India Store Department, Acton, London, W.3. The salary scale for the post is £580 × £25 – £670 p.a., plus pay supplement £43 10s. p.a. on salary not exceeding £500 p.a., and £55 p.a. on salary £500 and over. The starting pay shown is at age 23 or over, less one increment for each year under that age. The scale applies equally to men and women candidates. Terms and conditions of appointment and standard forms of application may be obtained from Establishment Department, India House, Aldwych, London, W.C.2. TEMple Bar 8484). The last day for receipt of application is May 10, 1957.

THE NIGERIAN RAILWAY CORPORATION invites applications for appointment as RESEARCH OFFICER. Salary £2,250 per annum. Qualifications: Candidates must be Chartered Civil or Mechanical Engineers or possess an engineering degree with 10 years' experience in metallurgy, photomicrography soil mechanics, combustion, fuel oil and water testing, chemical analysis, technical and practical investigation into such problems as flange and railwear, faulty design, elimination of bad riding in rolling stock, etc. Appointments are pensionable or on contract terms with Gratuity of 20 per cent. of pay p.a. Tours of fifteen months with full pay leave at the rate of seven days per month of service. Free passage for officer and family. Separate domicile allowance £75 p.a. per child for two children. Part furnished quarters at low rental. Outfit allowance £60 on first appointment. Applications to: The London Representative, Nigerian Railway Corporation, 11, Manchester Square, London, W.1.

LONDON TRANSPORT has vacancies in a TRAINING SCHEME for qualified electrical or mechanical engineers to train as RAILWAY ENGINEERS.

Qualifications.

Applicants must:—

1. Possess a University degree, Higher National Certificate or similar qualification;
2. Have completed National Service;
3. Be not more than 28 years of age.

A special knowledge of or interest in electric traction would be advantageous.

Training Scheme.

The object of this scheme is to train promising young engineers for responsible technical and managerial posts in the department of the Chief Mechanical Engineer (Railways). During the two year training period successful candidates will receive practical training in electric traction, in the maintenance of electric railway rolling stock, and in the associated large-scale factory and depot organisations. The curriculum is broad: it will include suitable courses in management subjects and visits to outside undertakings.

Salary During Training.

Commencing salary (with Higher National Certificate) will be £575 to £675 per annum according to age, with additional increments for a degree.

Promotion Prospects.

Successful trainees will be offered established appointments on the general technical staff and be employed as assistants to engineers. The minimum salary immediately upon completion of training will be £735 per annum. For men of proven ability there are good prospects of promotion to higher technical and managerial posts by normal competition for internally advertised vacancies. Other facilities include free travel; a further education scheme; and admission to a contributory superannuation fund after one year of service in the training scheme. Applications stating age, qualifications and experience should be addressed to: The Recruitment & Training Officer (T/GT4), London Transport, 55, Broadway, S.W.1.

WE solicit your enquiries for RAILS, CHAIRS, KEYS, SLEEPERS, CROSSING TIMBERS, etc., and complete installations of Track. The Railroad Plant Supplies Co. Ltd., Wombourn Station Sidings, Wombourn, Wolverhampton. Tel.: Wombourn 3388.

FOR DISPOSAL.—Approx. 3 miles of STANDARD GAUGE RAILWAY TRACK, in good condition, and comprising B.S. 95 lbs. section B.H. Rails, in chiefly 60-ft. lengths; S.1 Type Chaired Sleepers and Turnouts and Crossings, etc. The track is lying in North Wales, and inspection can be arranged by appointment. Contact Eagre Construction Co. Ltd., Scunthorpe. Tel. 4513/7.

SALE OF RAILWAY MATERIAL.—200 Tons Serviceable 95-lb. B.H. RAILS, in 60-ft. lengths. 2,200 No. Relayable S.1 TYPE CHAIRED SLEEPERS. 1,000 No. Relayable PLAIN SLEEPERS. Relayable CROSSING TIMBERS. Serviceable TURNOUTS, FASTENINGS, etc., to suit. Delivery Ex Stock. Eagre Construction Co. Ltd., East Common Lane, Scunthorpe. Tel. 4513/7.

MINISTRY OF WORKS. WISSINGTON RAILWAY, West Norfolk. For sale by tender. either as a going concern or for removal of material, Approximately 18 MILES OF STANDARD GAUGE TRACK, including various sidings totalling 4,785 yards. Rolling stock comprises a SIX-WHEELED COUPLED TANK ENGINE, 13-inch inside cylinders, built 1924, which may be tendered for as a separate item. Small stock of maintenance materials. Further information and forms of tender may be obtained from: Ministry of Works, Directorate of Lands and Accommodation, Room 275, Romney House (W. Block), Marsham Street, London S.W.1 (Telephone No. Abbey 7755, Extension 625), through whom arrangements for inspection may be made. Closing date for receipt of tenders June 14th, 1957. Enquirers are particularly asked to state if they are interested in the sale as a going concern otherwise only information about materials, etc., will be supplied.

BOUND VOLUMES.—We can arrange for readers' copies to be bound in full cloth at a charge of 25s. per volume, post free. Send your copies to the SUBSCRIPTION DEPARTMENT, Tothill Press, Limited, 33, Tothill Street, London, S.W.1.

Railway Stock Market

Activity continued in stock markets with attention again centred on industrial shares. Sentiment remained under the influence of estimates of the extent of which individual companies are likely to benefit from the tax concession in respect of earnings of overseas assets. On the other hand, British Funds were again lower on balance, this section of markets having continued to be affected by the view that an early cut in the bank rate is unlikely despite the further fall in the Treasury Bill rate.

Antofagasta again provided the most active feature among foreign rails, but at 32½ lost part of the rise recorded a week ago. The preference stock remained at 46½.

Mexican Central "A" bearer debentures at 71¼ were also the same as a week ago. Business around 51 was recorded in Dorada ordinary stock. Costa Rica 6½ per cent first debentures have marked 73, and the 6½ per cent second debentures 86. Chilean Northern debentures changed hands at 43½, and Brazil Railway bonds were dealt in around 5¾. United of Havana second income stock was again 8 and the consolidated stock eased to 2½.

Canadian Pacifics at $67⅛ were virtually the same as a week ago, and yield not far short of 5 per cent. This is regarded as a good return for an investment which offers a means of acquiring an interest in the future of Canada. The preference stock remained at £58, but the 4 per cent debentures were fractionally easier at £69⅞. White Pass shares changed hands around $21½.

The shares of locomotive builders and engineers have displayed rather more activity and were generally well maintained with Gloucester Wagon 10s. shares at 13s. 9d. and Wagon Repairs 5s. shares 14s. Beyer, Peacock, which yield nearly 7½ per cent, were 44s., compared with 43s. 9d. a week ago, and Charles Roberts 5s. shares have been quite well maintained at 11s. 3d. Hurst Nelson were again 36s. 6d. at Glasgow and North British Locomotive shares moved up further from 15s. 3d. to 15s. 9d., but Birmingham Wagon eased from 19s. to 18s. 4½d. G. D. Peters were 30s.; and elsewhere, because of some disappointment with the unchanged 10 per cent dividend, Vickers have receded in price from 45s. to 44s. Cammell Laird 5s. shares remained at 12s. awaiting the financial results. In response to the terms of the take-over terms offered by the Hawker group, the 5s. shares of the Brush Group moved up further from 6s. 4½d. to 7s. 1½d. Associated Electrical were 68s. 6d. and Crompton Parkinson 5s. shares firm at 17s. General Electric changed hands around 57s. 6d.

English Electric were 58s. 6d. Rumours have revived that terms may be announced soon of the expected issue by the latter company, which is expected to be a rights offer to shareholders. Most popular guess is that it may amount to some £15,000,000, partly in debentures and perhaps some £5,000,000 in ordinary shares. T. W. Ward shares were again strong and active and have risen further from 76s. 3d. to the new high record of 78s. 3d. B. I. Cables rallied strongly from 51s. 9d. to 53s. 9d. Tube Investments at 65s. 3d. were within a few pence of the level a week ago.

Westinghouse Brake have been active at 41s. "ex" the issues with the new shares at a premium of 6s. 7½d. The good yield brought in further demand for British Oxygen, which moved up to 37s.